

THE INSTRUCTOR:

OR,
Young Man's best Companion:

CONTAINING,

Spelling, Reading, Writing, and Arithmetick in an easier Way than any yet published; and how to qualify any Person for Business, without the Help of a Master.

Instructions to write Variety of Hands, with Copies both in Prose and Verse. How to write Letters on Business or Friendship. Forms of Indentures, Bonds, Bills of Sale, Receipts, Wills, Leases, Releases, &c. Also Merchants Accompts, and a short and easy Method of Shop and Book-keeping, with a Description of the Product, Counties, and Market-Towns in England and Wales.

Together with the Carpenter's plain and exact Rule: Shewing how to measure Carpenters, Joiners, Sawyers, Bricklayers, Plasterers, Plumbers, Masons, Glaziers, and Painters Work. How to undertake each Work, and at what Price; the Rates of each Commodity, and the common Wages of Journeymen; with Gunter's Line, and Coggeshall's Description of the Sliding Rule.

Likewise the Practical Gauger made Easy; the Art of Dialling, and how to erect and fix any Dial; with Instructions for Dying, Colouring, and making Colours; and some General Observations for Gardening every Month in the Year.

To which is added,

The Family's best Companion, with Instructions for Marking on Linnen; how to Pickle and Preserve; to make divers sorts of Wines; and many excellent Plaisters and Medicines, necessary in all Families.

By GEORGE FISHER, Accomptant.

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The PREFACE.

I Need say but little by way of Preface, in relation to the Usefulness of this Book, the Title Page so fully declaring its Contents: But as a Preface is usually expected I must and cannot well avoid saying something with respect to its Utility.

As to the first Step of forming the Young Man's Mind for Business, viz. The being instructed in, and acquainted with, our Mother Tongue, viz. English, it must and is acknowledged by all, to be a due and principal Qualification in Writing Business, and therefore it is necessary to be therewith well acquainted.

Then in the next place, to write a good fair, free, and commendable Hand, is as necessary in most, if not in all the Affairs of Life, and Occurrences of Business.

The next Thing touched on, is in relation to the Inditing of some few Epistles or Letters in a familiar Stile, and on sundry Subjects and Occasions: with Directions how to subscribe or conclude a Letter, and also to superscribe or direct Letters, according to the different Ranks, and Qualities of the Persons to whom directed: And this can't be denied but to be a Qualification fit for a young Man, and also to others of more adult Years.

The next Accomplishment for a young Man, and largely treated on in this Book, is that excellent Science of Arithmetick, both Vulgar and Decimal: landing him by the Hand, and by easy Steps, through its whole Course.

Again, The Young Man is next shewn the ingenious Art of Book keeping after the Italian Manner, by way of Double Entry; and this is an Accomplishment that capacitates him for Business in the highest Degree: Under which Head, he is also inform'd how to draw out, or make various sorts of Accounts or Writings relating to Mercantile Affairs; as

Bills of Lading, Invoices, Accompts of Sales, together with Authentick Examples of Bills of Exchange, with Notes concerning them; likewise Bills of Parcels of divers Kinds; also various sorts of Receipts, &c. All which is expedient for a Young Man to know and understand, if he'd be dextrous in Business.

The Young Man is here also Instructed in relation to the Affairs of Business at the Waterside, as to Shipping off and Landing Goods, &c.

Next he hath a Description of England and Wales, each County being particularly spoken of, with respect to its Product, Soil, and Extent, and likewise the Names of its several Market Towns.

Here are also, easy, plain, and likewise curious Directions for Measuring all sorts of Planes and Solids (Arithmetically and Instrumentally) as the Works of Carpenters, Joiners, Sawyers, Bricklayers, Masons, Plasterers, Painters, Glaziers, &c. with the Prices of their Works.

Here is likewise shewn the Methods of Extracting the Square and Cube Roots, with some of their Uses, in relation to Measuring, &c.

Also Practicall Gauging of divers Kinds of Vessels, Tuns, &c. Likewise Dyalling in various Kinds, with the Representation of the several sorts of Dials, and how to beautify and adorn them.

Next, are Precedents of Law Writings, as Bonds, Bills, Indentures, Wills, Letters of Attorney, &c.

Lastly, Some Directions relating to the pleasant and delightful Art of Gardening, with general Observations for every Month in the Year. To which is subjoined, Some Instructions to Young Women how to Pickle and Preserve all Kinds of Fruits and Flowers, &c. with Instructions for making divers sorts of Wines of English Growth; and also for preparing many excellent Medicines, Plaisters, &c. with several good Prescriptions of proper Use against most Distempers: fit for, and necessary in all Families.

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INSTRUCTIONS

FOR

YOUTH,

To SPELL, READ, and WRITE

True *ENGLISH*.

The Use of Great and Small Letters; how to divide them into Vowels and Consonants; what Diphthongs are; their Numbers, and how pronounced and written.

THE Subject Part of this Book being to instruct Young (as well as Old) People, in the general Rules of Business and Conversation thereunto belonging, the first Step I shall take for forming the Mind for Business, is that most necessary Accomplishment, the Spelling and Writing good and proper

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proper *English*; for let a Person write never so good a Hand, yet if he be defective in Spelling, he will be ridiculed and contemptibly smiled at, notwithstanding his fair Writing; and which will indeed, make his Orthographical Faults the more conspicuous. But to the Matter.

First, We are to take notice, that of Letters are made Syllables, of Syllables Words, and of Words Sentences, &c.

The Letters are in Number 24; to which if you add *j* and *v* Consonants, being of a different Shape and Sound from the Rest, they make 26. As to the Letters, we are to observe their Names, their Form, and their Force: Their Names, whereby to know them; their Form, whether great or small; and their Force, in Pronunciation or Utterance.

Letters are distinguished according to their Sound, into Vowels and Consonants: A *Vowel* is a Letter that soundeth by itself, and they be five in Number, viz. *a, e, i, o, u*, and *y* the Greek Vowel; which also, is a Vowel in *English*, when it cometh after a Consonant, and hath the Sound of *i*; as in *by, sty, reply, &c.* A *Consonant* is a Letter that soundeth not, except it be joined with a *Vowel*, for without one of the Vowels no Syllable can be made; as, *b, c, d, &c.* without the Aid of a *Vowel*, make nothing: So that *Vowels* and *Consonants* may be compared to *Nouns Substantive* and *Nouns Adjective*, each requiring the others Assistance. Though we have but 24 Letters, and 6 of 'em *vowels*, yet we have 21 *Consonants*; for *j, v, and y*, when they are set before any *Vowel* in the same Syllable, become *Consonants*; as was said before concerning *y*; as in *Jupiter, Juno, Filt, Vulgar, Violent, Vigour, &c.* Note, That *j* consonant hath the Sound of *g*, as in *join, jangle, jingle, &c.*

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When two *Vowels* come or meet together in a Word, and are not parted in the Pronunciation, but united in one Sound, such are called *Diphthongs*; being 12, viz. *ai, ei, oi, and ui, au, eu, ou, ee, oo, ea, eo, oa, and ei*; as in *Maid, Faith, Either, Join, Aul, Eunuch, Stout, Feed, Seed, Food, Brood, Stealth, Wealth, People, Steeple, Boat, Goat, Heat, Beat, Feat, Friend, Field, &c.* Note, That in the first 7 Words, both *Vowels* are sounded; but in the other 15, one of them is scarcely heard.

There are also those that are called *Triphthongs*, where three *Vowels* meet in one Sound; as in *Beauty, Beau, Lieu, and View*: Likewise *ay, ey, oy, uy; aw, ew, and ow* become *Diphthongs* at the end of Words, but are called *improper Diphthongs*; as in *say, key, joy, saw, bow, &c.*

Of Letters Great and Small, and when to be used.

First Negatively, *Great Letters* are not to be used in the Middle or latter End of a Word, except the whole Word be so written, as *J E H O V A H, L O R D*, or Titles of Books, &c. For it would be very absurd to write thus: *To Mr. geORgE RoGeRs In thaMes StReEt.*

1st, *Great Letters, or Capitals*, are written at the Beginning of Sentences; as, *Fear God. Honour the King. Know when to speak, and when to hold your Tongue.*

2^{dly}, After every Period, or Full Stop, when new Matter begins: as, *Sometime after that Accident, another followed, which was this, &c. London May 16. Turin, June 12, &c.*

3^{dly}, All Proper Names of Persons, Places, Ships, Rivers, &c. are to begin with a Capital; as *George, London, the Dreadnought, Thames, Severn*: All Christian Names and Surnames, both of Men and Women, must

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begin with a Great Letter ; as, *Samuel Sharp, Mary Sweeting, &c.*

4^{thly}, The more eminent Words in a Sentence ; as, Faith is the Foundation of the Christian Religion : Or, my Word that we have a particular Regard or Defe-
rence for ; as *God, Christ, King, Queen, &c.*

5^{thly}, At the Beginning of every Line in Poetry ;
as,

*Improve your Time ; Time passeth quickly on ;
Nor doth so good succeed, as that that's gone.*

6^{thly}, All Names of Arts, and Sciences, and Trades ;
as, *Writing, Arithmetick, Geometry, Musick, Carpenter, Smith, &c.* And evermore the Personal Pronoun *I*, and the Interjection *O*, must be Capitals.

For it is ridiculous to write thus : On Monday last *i* came to your House, but *y*ou was not at Home ; then *i* went, &c.

Lastly, I think I may venture to give a general Rule when Capitals are to begin Words ; which is this : All Nouns Substantive may begin with a Great Letter ; and a Substantive may be known by the Signs either of *A, An, or The* before them ; as, *a House, a Mill, an Ox, an Ass, the City, the River, &c.* And I think the Adjective (which declares what Sort of a Thing the Substantive is) may be with a Small, and the Substantive with a Great Letter ; as, *the white Horse, the long Rope, brown Bread, fat Beef, &c.*

Small Letters are commonly written in all other Places, as Verbs of the Active and Passive Voice, &c.

Observations

Observations concerning the Sound of Letters, and which are omitted in Pronunciation.

A Is not sounded in *Pharaoh*, not in *Sabaoth*, but as if written *Pharo*, and *Saboth*; neither in *Marriage*, but as *Marrige*: also *Parliament* as *Parliment*, and *Chaplain* as *Chaplin*, &c. In some proper Names it is not sounded, but drop'd in the Pronunciation as in *Aaron*, *Isaac*, *Canaan*, *Balaam*, which are pronounced as if written *Aron*, *Ifac*, *Canan*, and *Balam*; but we must except *Ba-al*, and *Ga-al*. *A* is sounded broad like *aw*, in Words before *ld* and *ll*; as in *bald*, *scald*, *ball*, *wall*, *fall*, &c.

B Is not sounded in *ibumb*, *dumb*, *plumb*, *lamb*, *doubt*, *debt*, *subtle*, &c. but sounded as it written *thum*, *dum*, *plum*, *lam*, *dout*, *det*, *suttle*.

C Is sounded hard like *K*, before *a*, *o*, and *u*, and before *i* and *e*; as in these Words, *cane*, *came*, *comb*, *cub*, *clay*, *crane*, *crab*; and soft in *cement*, *city*, and *tendency*: *C* loseth its Sound in *Scene*, *Science*, and *Visuals*, and in *Verdict*, likewise in *indict*, *Indictment*; also before *k*, as in *slack*, *rack*, *stick*, *thick*, *brick*.

Ch Is sounded like *K*, in Words of Foreign Extraction, and in many proper Names of the holy Scripture; as in *Chorus*, *Chymist*, *Chrysostom*, *Christ*, *Cbederlao-mor*, *Baruch*, *Archippus*, &c. *Ch* in French Words sounds like *sh*, as in *Chevalier*, pronounced as *Shevalier*: *Machine* as *Masheen*, *Mareschal* as *Marshal*, *Capuchin* as *Capusheen*, *Chaise* as *Sbaize*, &c.

D Is not sounded in *Ribba d*, nor in *Wednesday*, but pronounced as *Ribbin* and *Wensday*; the Termination *ed* is shortened into *t*; as *burned*, *burnt*; *choaked*, *choakt*; *ripped*, *ript*; *passed*, *past*; *choped*, *chopt*; &c.

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E Is not sounded in *heart*, neither in *heartb*, or *dearib*, &c. and seldom heard but in Monosyllables; as in *me*, *he*, *she*, *ye*, *the*, &c. where it hath the Sound of *ee*: But in Words derived from the *Hebrew* and *Greek*, *e* hath its perfect Sound, as *Jesse*, *Jubile*, *Mamre*, *Ninive*, *Candace*, *Cloe*, *Eunice*, *Penelope*, *Salmone*, *Phebe*, *Epitome*, *Catastrophe*, *Gethsemane*; and from the *Latin* *simile*, and *premunire*, &c. *E final*, or *e*, at the End of a Word, serves to lengthen the Sound, and to distinguish it from other Words without *e*, which are sounded short; as in these Examples following, *viz.* *Cane*, *can*; *bate*, *bat*; *bite*, *bit*; *fare*, *far*; *hope*, *hop*; *made*, *mad*; *mane*, *man*; *scrape*, *scrap*; *stare*, *star*; *tune*, *tun*; *write*, *writ*; &c. And in Words of more than one Syllable, lengthens the Sound of the last Syllable, but doth not increase the Number of Syllables; as *admire*, *demise*, *blaspheme*, &c. *E* lengthens the Syllable in *Tyre*, *Kenite*, and *Sbu-la-mite*. *E* must not be made to lengthen a Syllable, when it is made short by two Consonants; as in *pass*, *turn*, *black*; not *passé*, *turne*, *blacke*. Words ending in *cre*, *gre*, and *tre*, sound the *e* before the *r*, as in these Words; *Acre*, *lucre*, *centre*, *sepulchre*, *tygre*, *maugre*, *mitre*, *lustre*; which are sounded as if written *Aker*, *luker*, *senter*, *sepulker*, *tyger*, *mauger*, *miter*, and *luster*. *E final*, when not sounded, serves to soften *c* and *g*, as in *ace*, *place*, *lace*, *spice*, *truce*, *oblige*, *huge*, *age*, &c. If Nouns in *e final* take *s* after them with an Apostrophe before it, it stands for his, as the *Pope's Eye*, or the *Eye of the Pope*. If without an Apostrophe, it makes the plural Number, as *Tables*. *E* must be joined to long *f* in these Words; *Horse*, *nurse*, *purse*; not *Hors*, *nurs*, or *purs*. If to *e* at the End of a Word, a long Vowel be added, the *e* is to be omitted, as in *writing*, *loving*, *doing*, &c. not *writing*, *loveing*, or *doeing*; except the Terminations *ge* and *ce* before *able*, as in *change-able*, *peace-able*, &c. *E* must not be

be written after a Diphthong, in these Words; *Vain*, *maid*, *gain*, *fear*, *gnaw*, &c. not *Vaine*, *maide*, *gaine*, &c.

F In Plurals is changed into *v*; as *strife*, *strives*; *staff*, *staves*.

G Is not sounded in *Sign*, *Reign*, neither in *gnaw*, *gnat*, *assign*, *design*, *seignior*, *seraglio*, *phlegm*, &c. but sounded as if *senior*, *seraglio*, *steme*. G is sounded soft in *gender*, *ginger*, and *gipsy*; but hard in *Gibon*, *Gibeab*, *Gilboa*, *Gett-se-mane*; and hard also in these Proper Names, *Gibson*, *Gilman*, and *Gilbert*: and likewise in these common Words, *gelt*, *geld*, *gird*, *gimp*, *geese*, *gander*, *gabble*, *gather*, *gild*, &c. Observe, That if G be hard with a long Vowel, *ue* is joined, and pronounced in the same Syllable; as in *Plague*, *Prague*, *Hague*, *Rogue*, *League*, *Dialogue*, *Catalogue*, &c.

Gh In the End of some Words, where *au* or *ou* goes before, hath the Sound of *ff*, as in *tough*, *rough*, *cough*, *laugh*, sounded as if *tuff*, *ruff*, *coff*, *laff*; but *buff*, *cuff*, *snuff* and *buff*, must be so written.——Gh is not sounded in *mightry*, *though*, *through*, neither in *Daughter*, or *Vaughan*.

H Hath place, but no Sound, in *Chrystal*, *Chronicle*, *Christ*, *Ghost*, *John*, *Rhine*, *Schedule* and *Schism*. H is not sounded at the End of Words, if it be alone, without *t* or *c* before it, as *snatch*, *watch*, &c.

I is not sounded in *adien*, *juice*, *venison*, *fruit*, *bruise*, *Salisbury*; but sounded like *ee* in *oblige*, *magazine* and *machine*, &c. I is sounded long in proper Names ending in *iah*, as *Jeremiah*, *Hezekiah*; but short in *A-ri-el* and *Mi-ri-am*.——The tail'd *j*, or Consonant, hath been spoke of before.

K Is nearly allyed in Sound with C; but to know when to use one, and when the other, note, that C hath the Force of K only before *a*, *o*, *oo*, and *u*, and these two Consonants *l* and *r*; and therefore we must not write

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kare for *care*, *Kow* for *Cow*, *Krown* for *Crown*: And the Use of *K* is only before *e*, *i*, and *n*; wherefore we must write *keep*, *key*, *knight*, *kill*, &c. not *ceep*, *cey*, *cnight*, nor *cill*: We must write *Calendar*, *Catherine*, rather than *Kalendar*, or *Katherine*.

L Is not founded in *Calf*, *half*, *chalk*, *stalk*, *walk*; but pronounced as if *Cafe*, *bafe*, *chaük*, *stauk*, *wauk*. Neither is *l* pronounced in *Bristol*, *Holborn*, *Lincoln*, *Salmon*, or *Chaldron*; but founded as if writ *Bristow*, *Hoburn*, *Lincop*, *Sammon*, and *Chaudern*; nor in *Colonel*, where the first *l* hath the sound of *rr*, as *Curronel*.

M Hath the sound of *n*, in the word *Accompt*.

N Is not heard in *Autumn*, *Lime-kiln*, *solemn*, *limn*, *Hymn*, *Column*, nor in *condemn*.

O Is not founded in *People*, *Feeffee*, *Bafon*, *Mutton*, and lost also in *Teaman*, *Mafon*, *Righteous*, *Beacon*, *Jeopardy*, and *Crimson*.—*O* sometimes sounds like *oo*; as in *doing*, *moving*, *proving*, &c. *O* is not heard in *Coroner*, *Damofel*, *Nicholas*, *Carrion*, nor in *Chariot*; but pronounced as if writ *Crowner*, *Damfel*, *Nicklas*, *Carrin*, and *Charrit*.—*O* is sometimes founded like *i*; as in *Women* and *Flagon*; pronounced as if *Wimmen* and *Flaggin*. And sometimes *O* is founded as *u*; as in *Conduit*, *conjure*, *Attorney* and *Monmouth*, being heard as if writ *Cundit*, *cunjer*, *Atturney*, and *Munmouth*.

P Is written, but not founded, in *empty*, *presumptuous*, *psalm*, *sumpter*, *accompt*, *attempt*, *psalter*, and *symptom*; also in *sumptuous*, *contemptuous*, *recapt*, and *consumptive*, &c.

Pb Have the sound of *f*, when together in one Syllable; as in *Philosophy*, *Physician*, *Asaph*, and *Elephant*; but we must not write *Filosophy*, *Fysitian*, nor *Asaf*, or *Elefant*: *Pb* are parted in *Shep-berd*, *upbold*, and in *Clap-ham*; and other such compounded Words.

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Q After Q always follows u, in all Words; and in French Words, it hath the sound of k; as in *risque*, *liquor*, *cathol que*, *banquet*, *conquer*, *masquerade*, *chequer*; pronounced as *risk*, *likker*, *catholick*, *banket*, &c.

S is not sounded in *Island*, *Vifount*, or *Isle*, nor in *Lisle*; but pronounced as *Iland*, *Vicount*, *Ile*, and *Lile*.

There be two sorts of s's, the long s, thus, *s*; and the little s, thus, *s*; the long s in the Beginning and Middle of Words, (but never at the latter End;) and the short or small s at the latter End of Words, and sounds *hard* like z, in all the Words of the plural Number, and in Words of the third Person; as *Names*, *Worms*, *he reads*, *she bears*. S sounds *hard* in Words that terminate in *sion*, as in *circumcision*, *evasion*, *delusion*; but after a Consonant *soft*, as in *conversion*, *commission*, *dimension*. S is likewise sounded *hard* in these Words, viz. *raise*, *praise*, *chaise*, *cheese*, *these*, *compose*, *expose*, *bruise*, *refuse*, *applause*, *pause*, *clause*, *wisdom*, *casement* and *damsel*.—I do not think it any very great Abuse, to have the small s sometimes in the Beginning or Middle of a Word, as well as at the latter End; especially if a t follows it, thus, *st*.

Th Sounds *fine* in *thin*, *think*, and *wrath*; and is sounded *hard* in *thee*, *then*, *they*, *that*, *blithe*, *tithe*, and *fithe*; also, in *Mother*, *Brother*, *hither*, *thither*; and in *loath*, *cloath*, and *clothier*, &c.

Ti Before a Vowel or Diphthong, hath the sound of fi; as in *Patience*, *Dictionary*, *Gratian*, *Oblation*, *Nation*, *Translation*; except when f goes just before it, as in these Words, *Question*, *Fustian*, *Bastion*, *Combustion*, and *Celestial*, and also *Bestial*, &c. In some Words of Hebrew and Greek, ti retains its natural sound; as in *Shealatiel*, *Phaltiel*, *Shephatiah*, *Cotitiah*, *Adramyttium*, and the like; and in *mightier* and *mightiest*, *emptiest*, *emptied*; and from *pity*, we say *pi-ti-able*.

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U is sounded like *i* in *bury, birry; busie, bizzz; Business as Bizness.*

W Is not sounded, though written, in *answer, sword, whore, nor in swooning, acury*; neither is it heard in *wrap, wrath, wrong, wretch, wreath, wrangle, wriggle*; but pronounced as if written *sord, bore, souning*, and hath the Sound of *R* in the last seven Words, *viz, rap, rath, rong, &c.*

Wh Belongs to Words purely *Engliss*; as *when, what, where, and wheel.*

X Is sounded as *z*, in *Xenophon, Xerxes, Xenocrates, and Xantippe.*

T Is either a Vowel or Consonant, as hinted before. A Vowel, in *my, by, sly, thy*; and sometimes, when a Vowel, it hath the sound of *ee*, as in *worthily, Ebristianity, Liberty, formerly, formally, Normanby, and Dorothy.* *T* is a Consonant when it begins a Word, as in *yet, you, yonder, younger and yesterday.*

Z Hath its proper sound in *Zeno, zeal, zealous, and in Zenobia.* It hath the sound of *s*, in *Elizabeth, size, prize, and Melchizedeck*; the first of which Words hath formerly, and sometimes now is, writ with an *s*, thus, *Elisabeth.*

Thus far for the sound of Letters singly; and now I shall give a few Notes concerning Two Letters, when they are united in one sound, called *Diphthongs*: And first of

Ai and *Ay.* These have the sound of *a*, in *Air, fair, pair, may, stay, play*; but *a* is lost in *Calais*, (a Town of France); and pronounced separately in *Sinai*, (a Mountain of Arabia.)

Ei and *Ey* Are sounded in *eight, freight, sleight, and bey-day!* and are pronounced as *e*, in *Key, Veil, and convey*; but *Eye* must be excepted: And *ei* is sounded as *a*, in *Neighbour and Heir*, being pronounced as *Nabor and Are.*

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Oi and *Oy* Have a sound peculiar to themselves, as in *Oil* and *Oyster*; but make no Diphthong in *going* or *doing*.

Au, Aw Commonly keep a proper sound; as in *Augur, austere, daw, maw, saw, &c.* but *au* is lost in *Aunt* and *Guager*, being sounded as *Ant* and *Gager*; likewise is not heard in *Em-ma-us*, and *Cap-er-na-um*.

Eu and *Ew* Have an united sound in all Words, as in *feud, brew, new* and *grew*; but *eu*, is no Diphthong in *Zac-che-us*, or in *Bar-ti-me-us*.

Ou and *Ow*. *Ou* is express'd in *foul, soul, proud, loud*; and *ow* in *bow, Cow, and now*; but *ou* sounds like *oo*, in *soup* (a French Dish), *Stroud* (a Town in Kent), and *Cowper* (a Man's Name), sounded as if *Soop, Strood, and Cooper*.

Ee Is no Diphthong in *Be-e-rites, Be-er-she-ba*, and in *Be-el-ze-bub*, one of the *e*'s is dropt in Pronunciation; neither in Words beginning with *re*, or *pre*, as, *re-enter, pre-e-mi-nence*.

Oo Is properly sounded in *cool, fool, pool, and tool*; but hath the sound of *u*, in *root, foot, and foot*; and makes no Diphthong in *Co-os*, or *co-o-pe-rate*.

Ea Sounds like *a*, in *Sea, Pea, Seam, and Ream*; and hath the sound of *e*, in *Bread, Head, Lead, Dead, Search, Leather, Feather, Heaven, and Leaven*; but is no Diphthong in *Ven-ge-ance, Miscre-ant*, or any Hebrew, Greek, or Latin Words; as in *Ka-deß-Bar-ne a, Kir-jath je-a-rim*, nor in *Ce-sa-re-a, I-de-a*, or *O-ce-an*; neither in *re-al, Be-a-ti-tude, Cre-a-tor*; but except *Creature*; nor in Words beginning with *pre*, as *pre-amble, &c.*

Oa Is sounded as *o*, in *Goat, Boat and Coat*; and sounded broad, as *au*, in *broad and groat*; but is no Diphthong in *Go-a* (a City in India), or in the Hebrew Words *Zo-an, Zo-ar* and *Gil-bo a*.

Ie Before a single Consonant, sounds like *ee*, as in *brief, chief, and thief*; but if before two Consonants, it sounds like *e*; as in *Friend, Field*; but at the End of
English

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English Words, *e final* is not heard, as in *die*, *signifie* ; and is no Diphthong in *A-bi-e-zer*, *E-li e-zer*, nor in the *English Words* *Dier*, *Carrier*, or *Clo-thi-er* ; and in Words derived from the *Lat'n*, *ie* is parted, as in *Client*, *O-ri-ent*, *qui-et*, and *sci-ence*.

Ui Is sounded as *u*, in *juice*, *fruit*, and *suit* ; but *u* is lost in *conduit*, *build*, and *guise*, and is no Diphthong in *Je-su-it*, *ge na-in*, or *fru-i-tion*.

Æ and *OE Be* no *English Diphthongs*, but are used in *Æsop*, *Æneas*, *Ætna*, *Cesar*, *Œdipus*, and *Oeconomy*, which are express'd *Esop*, *Eneas*, *Etna*, *Cesar*, *Edibus*, *Economy* ; but in common Words they are neglected ; as in *Equity*, *Female*, and *Tragedy*, though derived of *Æquitas*, *Fœmina*, and *Tragœdia*.

Of Syllables, and their Division, being the Art of Spelling.

A *Syllable* is a taking Letters together, and uttering them in one Breath, as *Vir-tue* ; so that *Virtue* being thus divided, or taken asunder, makes two *Syllables*, viz. *Vir* and *tue* ; which put together, forms the Word *Virtue*. And many times, a Vowel, or a Diphthong, of themselves, make a *Syllable* ; as in *a-bate*, *e-ve-ry*, *i-dle*, *o-ver*, *u-su-rie* ; so of *Diphthongs*, as *au-ger*, *Eu-pace*, *ow-ner*, *ai-der*, *Oy-ster*, *Ea-ton*, *oa-ten* : By which we may particularly Note, That no *Syllable* can be made, be there never so many *Consonants*, or so few, without the Aid of a *Vowel* or *Diphthong*.

The longest *Monosyllables* we have in *English*, are *length*, *strength*, and *knights* ; which still would be nothing, without the Vowel *e* and *i*.

All Spelling may be taken in, under these Four following general Rules, or Heads.

1st, When

1st, When a Consonant comes between two Vowels, in dividing the Word into Syllables, the Consonant is joined to the latter Vowel; as in *sta-ture*, *na-ture*, *de-li-ver*, *u-ni-ty*, &c. except Compound Words that terminate in *ed*, *en*, *est*, *eth*, *er*, *ing*, *ish*, and *ous*; as *Coast-ed*, *Gold-en*, *know-est*, *know-eth*, *bear-er*, *fool-ing*, *bar-ba-rous*, *ra-ven-ous*, and *sub-urbs*.

2dly, When two Consonants come together in the Middle of a Word, they are to be parted, if not proper to begin a Word; as *Num-ber*, *stran-ger*, *for-tune*, &c. not *Numb-er*, *strang-er*, *for-tune*: To this Rule is excepted Words with *x*, as *Ox-en*, *Ex-er-cise*, &c. When the same Consonant is doubled in a Word, the first belongs to the foregoing, and the latter to the following Syllable, as in the Rule above, and in these Words, *Ab-ba*, *ac-cord*, *an-no*, *ad-ded*, &c.

3dly, Consonants that can begin Words, must not be parted in the Middle; as *a-gree*, *be-flow*, *re-frain*, &c. not *ag-ree*, *bes-tow*, *ref-rain*. These Consonants may begin Words, viz. *bl*, *br*, *ch*, *cr*, *dr*, *dw*, *fl*, *fr*, *gh*, *gl*, *gr*, *kn*, &c. as *blunt*, *break*, *chaw*, *cry*, *draw*, *dwell*, *flesh*, *ghost*, &c. On the contrary, Consonants that cannot begin Words, must be parted in the Middle, as in *Sul-tan*, and as said above.

4thly, When two Vowels come together, not making a Diphthong, they must be divided; as in *Vi-al*, *Va-li-ant*, *Li-o-nel*, *du-el*, *cru-el*, *me-te-or*, and *La-o-di-ce-a*.

Some particular Notes.

L Is doubled in Words of one Syllable; as, *Well*, *tell*, *swell*, *ball*, *wall*, *fall*, *will*, *bill*, *mill*, &c. But in Words of more than one Syllable, the Word always terminates with single *l*, as, *Angel*, *Babel*, *hurtful*, *duti-ful* and *beautiful*. Neither must *l* be doubled in *al-way*, *also*, *although*; not *allway*, *also*, and *althoug*; &c. But

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But Words accented on the last Syllable, must be excepted from the Rule above ; viz. *install, recall, in-roll, rebell* and *repell*.

T Must be used before the Termination *ing*, as *buying, lying, carrying, marrying, paying, slaying, burying, &c.*

The long *f* must never be used at the End of a Word, or immediately after the short or small *s*.

x Should be used instead of *ff*, where it appears to have been in the Original ; as *reflexion, connexion*, rather than *reflection, or connection, &c.*

Remember, That if you cannot write out the whole Word at the End of the Line, break it off at the End of a Syllable, thus ; _____ con-
demn ; not thus, _____ cond-
emn : Again, _____ dis-
charge ; not _____ disc-
harge.

c Must not be put between two Consonants ; as *think*, not *thinck* ; *thank*, not *thanck* ; *brink*, not *brinck* ; but if a Vowel goes before *c*, you must write *c* before *k*, as *brick, stick, thick, &c.*

e Final must not be placed after a Syllable made long by a Diphthong, as *Rain*, not *Raine* ; *Brain*, not *Braine* ; *restrain*, not *restraine*, &c. Neither is it necessary after a double Consonant, as *Inn*, and *add* ; not *Inne*, or *adde* : But we must except *Anne*, a Christian Name, and *Donne*, a Surname ; and also *Deale*, the Name of a Town in *Kent*.

Ph Must be retained in Words of a Foreign Original ; as *Phancy, Prophet* ; not *Fancy, or Profet*.

U Follows Q in all Words, as was said before.

Q Is better than K, in some Words from the *Latin*, as, *oblique, antique, relique*, rather than *oblake, antike, or velick*. Also *Paquet, Risque, Traffique, and Fabrique*, from the *French*.

K Is by some thought unnecessary in Words of Foreign Extraction, viz. *Arithmetic, Music, Logic, Public, Catholic, and Physic*; rather than *Arithmetick, &c.*

Of S and C. Some People may easily drop into Error by mistaking S for C, as in the beginning of the following Words, where C hath the perfect Sound of S, though C must undoubtedly be written; viz. in

Cieling	Cellar	Circle
Celestial	Censure	Circuit
Civet	Censor	Cement
Certain	Cease	Cerufs
Cymbal	Celebrate	Centre
Cistern	Cell	Cinque
Centurion	Censer	Cypher
Cinnamon	Celerity	City
Ceremony	Cypress	Citron

But these Words must be written with S, viz.

Science	Scheme	Sciatica
Schedule	Scarcity	Scythian
Sceptre	Schism	

When to write *ti*, and when *fi*, — viz.
with ti. *with fi.*

Contention	Confusion
Action	Occasion
Contraction	Contusion
Attention	Oppression
Benediction	Allusion
Apparition	Ascension
Concoction	Aversion
Declaration	Asperision
Ambition	Commission
Contrition	Comprehension
Oration	Circumcision
Oblation	Conclusion

These

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These Words spell thus,

Passion, *not* Pashon.
 Fashion, *not* Fation.
 Cushion, *not* Cution.
 Gloucester, *not* Gloster.
 Worcester, *not* Worster.
 Salisbury, *not* Salsbury.
 Leicester, *not* Lester.
 Shrewsbury, *not* Shrosbury.
 Carlisle, *not* Carlile.
 Westminster, *not* Westmister.

Another Qualification in Spelling, is rightly to distinguish Words of the *same Sound*, though widely different in their sense and signification: Such as these that follow, *viz.*

A		<i>Ally</i> , a Friend or Confe-
A Bel, Cain's Brother	derate.	
<i>Able</i> , to do a thing	<i>Alay</i> , or give Ease	
<i>A Bell</i> , to ring	<i>Alloy</i> , baser Mettle	
<i>Accidents</i> , Chances	<i>Altar</i> , for Sacrifice	
<i>Accidence</i> , a Book	<i>Alter</i> , to change	
<i>Acre</i> , of Land	<i>Ale-boof</i> , an Herb	
<i>Acorn</i> , of an Oak	<i>Aloof</i> , at a Distance	
<i>Achor</i> , a Valley of that name	<i>Allow'd</i> , approved	
<i>Advice</i> , Counsel	<i>Aloud</i> , to speak so	
<i>Advise</i> , to counsel	<i>Amiss</i> , wrong	
<i>Account</i> , Esteem	<i>A Miss</i> , or Mistress	
<i>Accompt</i> , of reckoning	<i>Ant</i> , a Pismire	
<i>Ale</i> , a Drink	<i>Aunt</i> , a Father's Sister	
<i>Ail</i> , Trouble	<i>Anchor</i> , of a Ship	
<i>All</i> , every one	<i>Anker</i> , a Rundlet	
<i>Awl</i> , for Shoemakers	<i>A Peal</i> , of Bells	
<i>Alley</i> , a narrow Place	<i>Appeal</i> , to higher Powers	
	<i>Appear</i> .	

<i>Appear</i> , to be seen	<i>Barbary</i> , in Africa
<i>A Peer</i> , a Lord	<i>Barberry</i> , a Fruit
<i>Aray</i> , good Order	<i>Bare</i> , naked
<i>Array</i> , to cloth	<i>Bear</i> , a Beast, or to bear
<i>A Rose</i> , to smell to	<i>Bays</i> , of Bay Trees
<i>Arose</i> , did rise	<i>Baiz</i> , Cloth, of Colchester
<i>Are</i> , they be	<i>Base</i> , vile
<i>Heir</i> , to an Estate	<i>Bas</i> , in Music
<i>Arrant</i> , notorious	<i>Belly</i> , part of the Body
<i>Errand</i> , a Message	<i>Belie</i> , to speak falsely
<i>Arrows</i> , to shoot	<i>Be</i> , they are
<i>Aras</i> , Hangings	<i>Bee</i> , that makes Honey
<i>A Scent</i> , or Smell	<i>Beer</i> , to drink
<i>Ascent</i> , a going up	<i>Bier</i> , to carry the Dead on
<i>Assent</i> , Agreement	<i>Bell</i> , to ring
<i>Assistance</i> , Help	<i>Bel</i> , an Idol
<i>Assistants</i> , Helpers	<i>Berry</i> , a small Fruit
<i>Augur</i> , a Soothsayer	<i>Bury</i> , the Dead
<i>Augre</i> , to bore with	<i>Blue</i> , a Colour
<i>Ax</i> , to cut with	<i>Blew</i> , as the Wind
<i>Acts</i> , of Parliament	<i>Board</i> , a Plank
<i>Austere</i> , severe	<i>Bor'd</i> , a Hole
<i>Oyster</i> , a Shell-Fish	<i>Boar</i> , a Beast
B	<i>Bore</i> , to bore
<i>Babel</i> , the Tower	<i>Boor</i> , a Country Fellow
<i>Babble</i> , to prate	<i>Bold</i> , Confident
<i>Bacon</i> , Hogs Flesh	<i>Bowl'd</i> , at the Jack
<i>Baken</i> , in the Oven	<i>Bolt</i> , the Door
<i>Beckon</i> , to make a Sign	<i>Boult</i> , the Meal
<i>Bail</i> , a Surety	<i>Bow</i> , to bend, or the Bow
<i>Bale</i> , of Goods	<i>Bough</i> , of a Tree
<i>Bald</i> , without Hair	<i>Boy</i> , a Lad
<i>Bawl'd</i> , cry'd out	<i>Busy</i> , of an Anchor
<i>Ball</i> , to play with	<i>Bread</i> , to eat
<i>Bawl</i> , to cry aloud	<i>Bred</i> , brought up
<i>Barbara</i> , a Woman's Name	<i>Breeches</i> , to wear

Breaches,

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<i>Breaches</i> , broken Places	<i>Campaign</i> , a wide Field or
<i>Bruit</i> , a Report	Summer's Expedition
<i>Brute</i> , Beast	<i>Choler</i> , Rage or Anger
<i>Barrow</i> , for Coneys	<i>Collar</i> , of the Neck
<i>Borough</i> , a Corporation	<i>Collar</i> , of Beef or Brawn
<i>By</i> , near	<i>Ceiling</i> , of a Room
<i>Buy</i> , with Money	<i>Sealing</i> , with a Seal
<i>Brews</i> , he breweth	<i>Cittern</i> , for Music
<i>Bruise</i> , a Hurt	<i>Citron</i> , a Fruit
<i>Brewis</i> , of Fat and Bread	<i>Clerk</i> , a Clergyman
C	<i>Clark</i> , of a Parish
<i>Cain</i> , that kill'd his Brother	<i>Clause</i> , part of a Sentence
<i>Cane</i> , to walk with	<i>Claws</i> , of a Beast or Bird
<i>Caen</i> , in Normandy	<i>Coat</i> , a Garment
<i>Calais</i> , in France	<i>Cote</i> , for Sheep
<i>Chance</i> , a Cup	<i>Comb</i> , for the Hair
<i>Call</i> , by Name	<i>Come</i> , hither
<i>Cawl</i> , or Suet	<i>Commit</i> , to do
<i>Cannon</i> , a great Gun	<i>Comet</i> , a blazing Star
<i>Canon</i> , a Church Rule	<i>Common</i> , usual
<i>Capital</i> , great or chief	<i>Commune</i> , or converse
<i>Capitol</i> , a Tower in Rome	<i>Condemn</i> , to Death
<i>Career</i> , full Speed	<i>Contemn</i> , to despise
<i>Carrier</i> , of Goods	<i>Council</i> , of the King
<i>Cellar</i> , for Liquors	<i>Counsel</i> , Advice
<i>Seller</i> , that selleth	<i>Con'd</i> , or could
<i>Censer</i> , for Incense	<i>Cud</i> , to chew as Beasts
<i>Confor</i> , a Reformer	<i>Current</i> , passing or running
<i>Censure</i> , to judge	Stream
<i>Centaury</i> , an Herb	<i>Courant</i> , a Messenger or
<i>Century</i> , 100 Years	News-Paper
<i>Centry</i> , or Sentinel, a Soldier on Guard	<i>Currants</i> , Fruit
<i>Chair</i> , to sit in	<i>Crick</i> , in the Neck
<i>Chare</i> , a Job of Work	<i>Creek</i> , of the Sea or River
<i>Champaigne</i> , Wine of France	<i>Cousin</i> , a Relation

Cozen,

Cozen to cheat

Cymbal a Musical Instru-
ment

Symbol a Mark or Sign

Cypress a Tree

Cyprus an Island

Cruse for Oyl

Cruise by the Sea Coast

Cygnets a young Swan

Signet a Seal

D

Dane of Denmark

Daign to vouchsafe

Dam stopping Water

Damn to condemn

Dame a Mistress

Dear of Price

Deer in a Park

Deceased dead

Diseased sick

Decent becoming

Descent, going down

Dissent to disagree

Deep low in the Earth

Diep a Town in France

Defer to put off

Differ to disagree

Derbe a City of Asia

Derby a Town of England

Desert Merit

Desart a Wilderness

Dew a falling Mist

Due owing

Do to make

Doe a Female Deer

Dough Paste

Don a Spanish Lord

Done acted

Dun of Colour

Dolphin a Fish

Dauphine the French King's
eldest Son

Devices Inventions

Devizes in Wiltshire

Doer that doth

Door of a House

Dragon a Beast

Dragoon a Soldier

Draught of Drink

Drought Dryness

Dolour Grief or Pain

Dollar a Piece of Money

Demure sober

Demur a stop or doubt

E

Ear of the Head

E'er ever

Early betimes

Tearly every Year

Earth the Ground

Hearth of a Chimney

Easter the Festival

Esther a Woman's Name

Enter to go in

Interr to bury

Intire whole

Elder not the younger

Eldern a Tree

Eaten or swallowed

Eton, a Town's Name

Eminent famous

Imminent over Head

Enow

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<i>Enow</i> in Number	<i>Flower</i> of the Field
<i>Enough</i> in Quantity	<i>Flour</i> Meal
<i>Earn</i> to deserve	<i>Floor</i> of a Room
<i>Tarn</i> woollen thred	<i>Follow</i> to come after
<i>Tearn</i> to pity	<i>Fallow</i> Ground not plow'd
<i>Envy</i> or Hatred	<i>Find</i> to find any Thing
<i>Envoy</i> a Messenger	<i>Fin'd</i> amerced
<i>Exercise</i> Labour or Practice	<i>Fiend</i> a Devil
<i>Exorcise</i> to conjure	<i>Flea</i> off the Skin, and also
<i>Err</i> to mistake	a Vermin
<i>Er</i> Brother to <i>Onan</i> Sons of	<i>Flee</i> to escape
Judah	<i>Fowl</i> a Bird
<i>Extant</i> in being	<i>Foul</i> dirty
<i>Extent</i> Distance	<i>Francis</i> a Man's Name
F	<i>Frances</i> a Woman's Name
<i>Fain</i> desirous	<i>Frays</i> Quarrels
<i>Veign</i> to dissemble	<i>Froise</i> Pancake with Bacon
<i>Fair</i> beautiful or	G
Market	<i>Gall</i> of a Beast
<i>Fare</i> Victuals	<i>Gaul</i> France.
<i>Faint</i> weary	<i>Garden</i> of Herbs
<i>Feint</i> a false March	<i>Guardian</i> an Overseer
<i>Fourth</i> in Number	<i>Genteel</i> graceful
<i>Forth</i> to go out	<i>Gentile</i> a Heathen
<i>Feed</i> to eat	<i>Gentle</i> mild
<i>Fee'd</i> rewarded	<i>Gessure</i> Carriage
<i>Fir</i> Wood	<i>Jester</i> a merry Fellow
<i>Fur</i> or Hair	<i>Groan</i> with Grief
<i>Felon</i> a Criminal	<i>Grown</i> greater
<i>Fellon</i> a Whitlow	<i>Guilt</i> of Sin.
<i>Pile</i> of Steel	<i>Gilt</i> with Gold
<i>Foil</i> put to the worst	<i>Greater</i> bigger
<i>Fly</i> as a Bird	<i>Grater</i> for Nutmegs
<i>Fly</i> or Insect	<i>Grave</i> for the Dead
<i>Philip</i> a Man's Name	<i>Greave</i> Armour for the
<i>Phillip</i> , with the Fingers	Leg

Guests

<i>Guest</i> to imagine	<i>Higher</i> taller
<i>Guest</i> one entertain'd	<i>Hire</i> Wages
<i>Gluttonous</i> greedy	<i>His</i> of him
<i>Glutinous</i> sticking as Pitch	<i>Hiss</i> as a Snake ; or to de-
<i>Great</i> large	ride
<i>Grate</i> for Coals, &c.	<i>Hoar</i> Frost
<i>Graze</i> to eat Grass	<i>Whore</i> a lewd Woman
<i>Grays</i> a Town	<i>Hole</i> or Hollowness
<i>Groat</i> Four-pence	<i>Whole</i> intire
<i>Grot</i> a Cave	<i>Ho ! lo !</i> to call
<i>Gallies</i> Ships with Oars	<i>Hallow</i> to make holy
<i>Gallows</i> for Criminals	<i>Holy</i> pious
H	<i>Wholly</i> intirely
<i>Have</i> of the Fields	<i>Home</i> one's House
<i>Hair</i> of the Head	<i>Holm</i> Holly
<i>Harsh</i> severe	<i>Hoop</i> for a Tub
<i>Hast</i> minced Meat	<i>Whoop</i> or ho ! lo !
<i>Haven</i> a Harbour	<i>Hugh</i> a Man's Name
<i>Heaven</i> a large Place	<i>Hue</i> of Colour
<i>Happiness</i>	<i>Hew</i> with an Ax
<i>Heart</i> of the Body	I
<i>Hart</i> of the Woods, or	<i>an I</i> , I my self
over-grown Buck	<i>Eye</i> to see with
<i>Herd</i> of Cattle	<i>Idle</i> lazy
<i>Heard</i> did hear	<i>Idol</i> an Image
<i>Hard</i> not soft or difficult	<i>I'll</i> I will
<i>Here</i> in this Place	<i>Ile</i> of a Church
<i>Hear</i> with the Ear	<i>Isle</i> an Island
<i>High</i> lofty	<i>Oly</i> of Olives
<i>Hie</i> away, make haste	<i>Impley</i> in Work
<i>Him</i> that Man	<i>Impley</i> , to signify
<i>Hymn</i> to sing	<i>In</i> within
<i>Hail</i> congeal'd Rain	<i>Inn</i> for Travellers
<i>Hale</i> the Ship	<i>Incite</i> to stir up
<i>Hall</i> in a House	<i>Insight</i> Knowledge
<i>Haul</i> pull	<i>Ingenious</i> of quick Parts
	<i>Ingenuous</i>

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Ingenuous Candid

Iron Metal

*Ironie speaking by
traries*

K

Ketch a Ship

Catch, to take

Kill to slay

Kiln for Lime

Kind good natur'd

Coin'd Money

Knave dishonest

Nave of a Wheel

Knight by Honour

Night Darknes

L

Laid placed

Lade the Water

Lane not a Street

Lain did lye

Latin a Tongue

Latten Tin

Lattice of a Window

Lettice a Woman's Name

Lettuce Sallade

Lease of a House

Leasb Three

Lees of Wine

Leese old word for Lose

Leaper that jumpeth

Leper one Leprous

Lessen to make less

Lesson to read

Least smallest

Left for fear

Letbargy sleepiness

Liturgie Church-service

Lier in wait

Con-Lyar that tells Lies

Limb a Member

Limn to paint

Line Length

Loyn of Veal

Low humble

Lo behold

Lose to suffer Loss

Loose to let go

Lower to let down

Lowr to frown

M

Made finished

Maid a young Woman

Main chief

Mare of a Horse

Male the He

Mail Armour

Manner Custom

Manour a Lordship

Market to buy or sell in

Mark it note it

Marsh low Ground

Mash for a Horse or of a

Net

Martin a Man's Name

Marten a Bird

Mead a Meadow

Mede one of Media

Mean of low Value

Mien Carriage or Aspect

Meat to eat

Metre to measure

Message Business

Messuage

Messuage a House

Mews for Hawks

Muse to meditate

Mighty powerful

Moiety half

Mile Measure

Moil Labour

Might Strength

Mite in Cheese

Moat a Ditch

Mote in the Sun

More in Quantity

Moor a Black

Mower that moweth

Moor barren Ground

Mortar made of Lime

Mortar to pound in

Mole Vermin

Mould to cast in

N

Nay denial

Neigh as a Horse

Neither none of the two

Nether lower

Naught bad

Nought nothing

Nigh near

Nye a Man's Name

Nice curious

Niece a Brother's Daughter

Not denying

Knot to tye

Note mark

Note of one's Hand

Nose of the Face

Noah's Ark

O

Oar of a Boat

Ore crude Metal

O'er over

Off cast off

Of belonging to

Our belonging to us

Hour of the Day

Oh alas

Owe in Debt

One in Number

Own to acknowledge

Order Rule

Ordure Dung

P

Pair a Couple

Pare cut off

Pear a Fruit

Pattin for a Woman

Patent a Grant

Peer a Lord

Pere of Dover

Peter a Man's Name

Petre Salt

Pail for Water

Pale of Countenance

Pale a Fence

Place Room

Plaise a Fish

Parson of the Parish

Person any Man

Pole for Hops

Poll of the Head

Pool of Water

Pore with the Eyes, or of
the Skin

Poor

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Poor necessitous
 Palate of the Mouth
 Pallet Bed
 P. fy a Nofegay
 Poefy Poetry
 Power mighty
 Pour as Water
 Prey a Booty
 Pray befeech
 Profit gain
 Prophet a Foreteller
 Practice Exercise
 Prattife to exercise
 Prefence being here
 Presents, Gifts
 Princes, the King's Sons
 Princess the King's Daugh-
 ters
 Please to content
 Pleas Defences
 Precedent an Example
 Prefident Chief
 Principal Chief
 Principle the first Rule

Q
 Quire of Paper
 Choir of Singers
 Queen the King's Wife
 Quean an Harlot

R
 Rack to torment
 Wreck of a Ship
 Rain Water
 Reign of the King
 Rein of a Bridle
 Rays of the Sun

Raise lift up
 Race to run
 Rafe to demolish
 Rice Grain
 Rise to get up
 Red in Colour
 Read the Book
 Reed of the Water
 Relick a Remainder
 Relict a Widow
 Roe of a Fish, or a Female
 Deer
 Row the Boat
 Right not wrong
 Rite a Ceremony
 Write with a Pen
 Wright a Wheelwright
 Redifh of Colour
 Radifh a Root
 Rear fet up
 Rere behind
 Ruff for the Neck
 Rough not smooth
 Rie, Corn
 Rye, in Suffex
 Wry, crooked
 Ring, the Bells
 Wring, the Hands
 Rime, a Fog or Mist
 Rhyme, Verfe
 Rhyne, of Cheefe
 Rode did ride
 Road the Highway
 Rote got by Heart
 Wrote did write
 Wrought did work

Savour

Sav
 Sav
 Shee
 Ship
 Sigh
 Cite
 Sail
 Sale
 Sink
 Cinq
 Slow
 Sloe
 Sow
 Seaw
 So th
 Sligh
 Sleigh
 Some
 Sum
 Soul o
 Sole a
 Sole o
 Son of
 Sun in
 Sore p
 Soar al
 Swore
 Stare t
 Stair a
 Stile to
 Style o
 Sound
 Nois
 Swoon t
 Straight

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S

Savour Taste or Smell

Saviour that saves

Sheep a Beast

Ship for the Sea

Sight View

Cite to summons

Sail of a Ship

Sale of Goods

Sink sink down

Cinque Five

Slow not quick

Sloe Fruit

Sow Seed

Sew with a Needle

So thus

Slight neglected

Sleight of Hand

Some a Part

Sum of Money

Soul or Spirit

Sole a Fish

Sole of a Shoe

Son of a Father

Sun in the Firmament

Sore painful

Soar aloft

Swore did swear

Stare to look earnestly

Stair a Step

Stile to get over

Style of Writing

Sound whole, firm ; also a

Noise

Swoon to faint away

Straight not crooked

Strait narrow

Succour Help

Sucker a young Sprig

Spear a Weapon

Sphere a Globe

T

Then at that Time

Than in Comparison

Tame gentle, not wild

Tbame in Oxfordshire

Tear to rent

Tear of the Eye

Tare an Allowance in
Weight

Tare a Vetch

Tail of a Beast

Tale a Story

Tiles for a House

Toyls Nets

Toil to labour

There in that Place

Their of them

Throne of the King

Thrown as a Stone

Tide, a Flowing of Wa-
ter

Ty'd made fast

Time of the Day

Thyme an Herb

Team of Horses

Teem with Child

To the Preposition

Two twice one

Too likewise

Toe of the Foot

Tow to draw

C

Tow

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Tow to spin
Told as a Story
Tell'd as a Bell
Tour a Journey
Tower of a Church

V

Vacation Leisure
Vocation a Calling
Vail a Covering
Vale between two Hills
Vain foolish
Vein of the Body
Vane or Weathercock
Value Worth
Valley a Vale
Vial a Glass
Viol a Fiddle

Y

Tour of you
Ewer a Bason
Use Practice
Use to be wont
Eaves Sheep

W

Wade in the Water
Weigh'd in the Scales

Whale of the Sea
Wail lament
Ware Merchandize
Were was
Where what Place
Weigh to weigh
Wey five Quarters
Weal good
Wheal from Scourging
Wield a Sword
Weald of Suffex in Kent
Wen in the Neck
When at what Time
White of Colour
Wight an Island
Whist Silence
Wist knew
Wood of Trees
Wou'd for would

Y

Tea yes
Te you
Ewe a Sheep
Tew a Tree
Tarn made of Wooll
Tearn to weep

Of Stops, Marks, and Points, used in Reading and Writing, with their Places and Significations.

THese are of absolute Necessity; and great Regard ought to be had to them, to avoid Confusion and Misconstruction, and for the better Understanding of what we read and write ourselves; and are likewise

likewise of Use to others that shall hear us read, or see our Writing: They teach us, to observe proper Distances of Time, with the necessary Raising and Falling of the Tone or Voice in Reading, and the needful Stops or Marks to be used in Writing, that we may understand it our selves, and that our Meaning may not be misunderstood or misapplied by others.

Stops, or Pauses, considered as Intervals in Reading, are indeed no more than Four; though there are other Marks to be taken notice of, but to other Purposes: The Names of these Four principal Stops are, *viz.* a *Comma*, *Semicolon*, *Colon*, and *Period* or *Full Stop*; and these bear to one another a kind of progressionall Proportion of Time; for the *Comma* signifies a Stop of leisurely telling One, the *Semicolon* Two, the *Colon* Three, and the *Period* Four.—And are made or mark'd thus:

Comma (,) at the Foot of a Word.

Semicolon (;) a Point over the Comma:

Colon (:) two Points.

Period (.) a single Point at the Foot of a Word.

, *Example of the Comma.*) There is not any thing in the World, perhaps, that is more talk'd of, and less understood, than the Business of a happy Life.

; *Example of the Semicolon*) It is but a Curse that makes way for a Blessing; the bare Wish is an Injury; the Moderation of *Antigonus* was remarkable.

: *Example of the Colon.*) A sound Mind is not to be shaken with popular Applause: But, Anger is startled at every Accident.

. *Example of the Period.*) It is a shame, says *Fabius*, for a Commander to excuse himself, by saying, I was not aware of it. A Cruelty that was only fit for *Marius* to suffer, *Sylla* to command, and *Cataline* to act.

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By the Examples foregoing, we may easily note, That a *Comma* is a Note of a short stay between Words in a Sentence; and therefore, the Tenor of the Voice must still be kept up.—The *Semicolon* is a little longer, and the Tone of the Voice very little abated.—The *Colon* signifies perfect Sense, though not an End of the Sentence; and the Voice a little abated or let fall.—The *Period* denotes perfect Sense, and the End of the Sentence.

? When the Question is asked, there is a crooked Mark made over the Period thus? and is called a Note of Interrogation: *Example*, What could be happier than that State of Mankind, when People lived without either Avarice or Envy? The Time of Pause for this Stop, is the same with the *Semicolon*.

! If a sudden Crying out, or Wondering, be expressed, then this Mark is made over the Full Stop, thus! and called a Note of Admiration, or Exclamation: *Example*, Oh the astonishing Wonders that are in the Elementary World!

() If one Sentence be within another, of which it is no Part, then 'tis placed between two Semicircles or Parenthesis, made thus (): *Example*, Pompey, on the other side, (that hardly ever spake in Publick without a Blush;) had a wonderful Sweetness of Nature. Again, Of Authors be sure to make choice of the best, and (as I said before) to stick close to them. Once more; Honour thy Father and Mother (which is the first Commandment with Promise) that it may be well with thee.—In Reading a Parenthesis, the Tone must be somewhat lower, as a Thing or Matter that comes in by the Bye; breaking in as it were on the main Coherence of the Period. The Time is equal to a Comma, and ought to be read pretty quick, lest it detain the Ear too long from the Sense of the more important Matter.

Apostrophe

' *Apostrophe*, is a Comma at the Head of Letters, signifying some Letter or Letters left out for quicker Pronunciation ; as, *I'll* for *I will*, *would'st* for *wouldest*, *shā'n't* for *shall not*, *ne'er* for *never*, *is't* for *is it*, *'tis* for *it is*, *i'th'* for *in the*, *o'er* for *over* : Or to denote a Genitive Case ; as, my Father's House, my Uncle's Wife, &c.

' *Accent* is placed over a Vowel, to denote that the stress or sound in Pronunciation is on that Syllable.

' *Breve*, or crooked Mark over a Vowel, signifies it must be sounded short or quick.

' *Caret* signifies something is wanting, and is placed underneath the Line, just where any Thing omitted, by Mistake or Forgetfulness, &c. should be brought in.

' *Circumflex* ; is of the same shape with the Carer, but is placed over some Vowel, to shew the Syllable to be long, as *Eu-phrā-tēs*.

" *Dialysis* ; or two Points plac'd over two Vowels in a Word, signifies they are to be parted, being no Diphthong.

- *Hyphen*, or *Note of Connexion*, is a straight Line ; which being set at the End of a Line, shews that the Syllables of that Word are parted, and the Remainder of it is at the Beginning of the next Line ; and sometimes is used in Compound Words, as *Burnt-sacrifices*, *Heart-breaking*, *Soul-healing*, *Book-keeper*, &c. *N. B.* That when you have not Room to write the whole Word at the End of a Line, but are obliged to finish it at the Beginning of the next, such Words must be truly divided, according to the Rules of Spelling ; as *re-strain*, not ————— *re-strain*. When the Hyphen is placed over a Vowel, it is properly a *Dash*, and signifies the Omission of *m* or *n* ; 'tis much used in old Latin Authors, and sometimes in
C ; English,

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English, especially in Law Business. *Example*, It is very comendable to write a good Hand.

 *Index*, is a Note like a Hand, pointing to something very remarkable.

* *Asterism*, or *Star*, directs to some Remark in the Margin, or at the Foot of the Page. Several of them together, denote something defective, or immodest, in that Passage of the Author.

† *Obelisk*, is a Mark like a Dagger, and refers to the Margin, as the *Asterism* *: And in Dictionaries, it signifies the Word to be obsolete, or old, and out of Use.

¶ *Paragraph*, denotes a Division, comprehending several Sentences under one Head.

§ *Section*, signifies the Beginning of a new Head of Discourse, and is used in sub-dividing a Chapter or Book into lesser Parts or Portions.

[] *Brackets* or *Crotchets*, generally include a Word or Sentence, explanatory of what went before; or Words of the same sense, which may be used in their stead.

“ *Quotation*, or double Comma reverse, is used at the Beginning of the Line, and shews what is quoted from an Author, to be in his own Words.

Thus much for Pointing, Stops and Marks ; which if carefully heeded and observed, will add Grace and Credit to your Writing.

Of Abbreviations.

To be ready in these, shews a Dexterity in Writing ; and is very necessary for Dispatch : For by these, we expeditiously express, or set down a Word, shortening it, by making some Initial Letter or Letters, belonging to the Word, to express it ; as in the Table following.

A. F O R Answer,	or <i>Aust.</i> Austin or Austria
Afternoon	<i>B. A.</i> Bachelor of Arts
<i>A. B.</i> Arts Bachelor	<i>B. D.</i> Bachelor of Divinity
<i>A. Bp.</i> Arch-bishop	<i>B. V.</i> Blessed Virgin
<i>Acct.</i> Account	<i>Bart.</i> Baronet
<i>A. D.</i> Anno Domini, Year	<i>Bp.</i> Bishop
of our Lord	<i>C.</i> Charles or Chapter
<i>A. M.</i> Anno Mundi, Year	<i>Cant.</i> Canticles or Canter-
o' the World	bury
<i>Admrs.</i> Administrators	<i>Cat.</i> Catechism
<i>A. M.</i> Artium Magister,	<i>Cha.</i> Charles or Charity
Master of Arts	<i>Chap.</i> Chapter
<i>Ana.</i> Of each a like Quan-	<i>Cent.</i> Centum
- tity	<i>Ch.</i> Church
<i>Ap.</i> April or Apostle	<i>Chanc.</i> Chancellor
<i>Adml.</i> Admiral	<i>Chron.</i> Chronicles
<i>Agt.</i> Against	<i>Capt.</i> Captain
<i>Amt.</i> Amount	<i>Clem.</i> Clement
<i>Anab.</i> Anabaptist	<i>Col.</i> Colossians
<i>Aug.</i> August	<i>Cl.</i> Clericus
<i>A. R.</i> Anno Regni, in the	<i>Co.</i> Country
Year of the Reign	<i>Coll.</i> Colonel
<i>As. P. G.</i> Astronomy	<i>Pro-Comrs.</i> Commissioners
fessor of Gresham	<i>Col-Con.</i> Constance or Constan-
lege	tine

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<i>Conf.</i> Confessor	<i>Eliz.</i> Elizabeth
<i>Cou'd</i> for could	<i>Esa.</i> Eſaiah
<i>Cor.</i> Corinthians, or	<i>Co-Epb.</i> Ephesians
rollary	<i>Eccl.</i> Eccleſiaſtes
<i>Cr.</i> Creditor	<i>Ex.</i> Exodus or Example
<i>C. R.</i> Carolus Rex, or	<i>Ev.</i> Evangelift
Charles the King	<i>Exp.</i> Explanation
<i>C. C. C.</i> Corpus Chriſti	<i>Expo.</i> Expoſition
College	<i>Eſq;</i> Eſquire
<i>C. S.</i> Cuſtos Sigilli, Keeper	<i>Exon.</i> Exeter
of the Seal	<i>Fr.</i> French or France
<i>C. P. S.</i> Cuſtos Privati Si-	<i>Feb.</i> February
gilli, Keeper of the	<i>Fra.</i> Francis
Privy Seal	<i>F. R. S.</i> Fellow of the Royal
<i>D.</i> Dean or Duke	Society
<i>Dan.</i> Daniel	<i>G.</i> God, Great or Goſpel
<i>Dr.</i> Doctor, or Debtor.	<i>Ga.</i> Galatians
<i>Dea.</i> Deacon	<i>Gen.</i> Genesis
<i>Do.</i> ditto	<i>Genmo</i> Generaliſſimo
<i>D. denarii,</i> pence	<i>Geo.</i> George
<i>Dec.</i> or <i>xber,</i> or <i>iober,</i>	<i>G. R.</i> Georgius Rex,
December	George the King
<i>Devon.</i> Devonſhire	<i>Gar.</i> Garriſon
<i>Deut.</i> Deuteronomy	<i>Gen.</i> General
<i>Dec.</i> Deceas'd	<i>Gent.</i> Gentleman
<i>D. C.</i> Dean of Chriſt	<i>Gosp.</i> Goſpel
Church	<i>Greg.</i> Gregory
<i>Doctr.</i> Doctrine	<i>Hen.</i> Henry
<i>D. D.</i> Doctor of Divinity	<i>Hamp.</i> Hamper
<i>E.</i> for Earl	<i>Hund.</i> Hundred
<i>Earld.</i> Earldom	<i>Hum.</i> Humphry
<i>Edm.</i> Edmund	<i>Heb.</i> Hebrews
<i>Edw.</i> Edw.	<i>i. e.</i> id eſt, that is
<i>E. gr.</i> Exempli gratia, for	<i>I. H. S.</i> Jeſus Hominum
Example	Salvator, Jeſus Saviour
<i>Eng.</i> England	of Men

Ancient Copy for Round Hand.

A B C D E F G H I J K L M N
O P Q R S T U V W X Y Z

a b c d e f g h i k l m n o p q r s
t u v w x y z &c. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Take great Care, and you'll Write fair.

The Italian Hand.

A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z

a b c d e f g h i k l m n o p q
r s t u v w x y z &c.

Art is gain'd by great Labour & Industry.



<i>Id.</i> Idem, the same	<i>Mat.</i> Matthew
<i>Inst.</i> Instance, or Instant	<i>m.</i> Manipulus, a handful
<i>Ja.</i> James, or Jacob	<i>M. A.</i> Master of Arts
<i>Jan.</i> January	<i>Maty</i> Majesty
<i>Jer.</i> Jeremiah	<i>Md.</i> Madam
<i>Jes.</i> Jesus	<i>Mons.</i> Monsieur
<i>Joⁿ</i> John	<i>Math.</i> Mathematician
<i>Jud.</i> Judges	<i>Mr.</i> Master
<i>Is.</i> Isaac	<i>Mrs.</i> Mistress
<i>I'll,</i> I will	<i>M. D.</i> Medicinæ Doctor,
<i>Is't,</i> Is it	Doctor of Physick
<i>I'd,</i> I had	<i>M. S.</i> Memorizæ Sacrum,
<i>I'm,</i> I am	Sacred to the Memory ;
<i>J. D.</i> Jurium Doctor, Doc-	also Manuscript
tor of Laws	<i>Mich.</i> Michael, or Michael-
<i>Jos.</i> Joshua	mas
<i>K.</i> King	<i>Min.</i> Minister
<i>Km.</i> Kingdom	<i>N.</i> Note, or Nativity
<i>Knt.</i> Knight	<i>Nat.</i> Nathaniel, or Nati-
<i>L.</i> Lord	vity
<i>l.</i> Liber, a Book	<i>N. B.</i> Nota bene, Note,
<i>L.</i> Libræ, Pounds	or mark well
<i>Lieut.</i> Lieutenant	<i>Nic.</i> Nicholas, or Nico-
<i>Lp.</i> Lordship	demus
<i>Ladyshp.</i> Ladyship	<i>N. S.</i> New Stile
<i>L. L. D.</i> Legum Doctor, No	Number
Doctor of Laws	<i>n. l.</i> Non liquet, it appears
<i>Learn</i> Learning	not
<i>Lon.</i> London	<i>Nov.</i> or <i>9ber,</i> November
<i>Et.</i> Letter	<i>O.</i> Oliver
<i>Lam.</i> Lamentations	<i>Obj.</i> Objection
<i>Lev.</i> Leviticus	<i>Obt.</i> Obedient
<i>Let's,</i> let us	<i>O. W.</i> Old Word
<i>M.</i> Marquess, or Monday,	<i>O. S.</i> Old Stile.
or Morning	<i>Oct.</i> or <i>8ber,</i> October
<i>Mar.</i> March	<i>Oxon,</i> Oxford

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<i>P.</i> Paul, Paulus, Publius,	<i>R.</i> Rex, King ; or Regina, or President	Queen
<i>Pugil.</i> a handful		<i>Revd.</i> Reverend
<i>Pen.</i> Penelope		<i>Rev.</i> Revelations
<i>Pd.</i> paid		<i>Rich.</i> Richard
<i>Par.</i> Parish		<i>Robt.</i> Robert
<i>p. per.</i> or by		<i>Rog.</i> Roger
<i>Pat.</i> Patience, or Patrick		<i>Ret.</i> Return
<i>per Ct.</i> per Centum, by	<i>Reg. Prof.</i> Regius Profes- sor, founded by King	
the Hundred	Henry 8th.	
<i>Parl.</i> Parliament		
<i>Pet.</i> Peter		<i>Rom.</i> Romans
<i>Phil.</i> Philippians, or Philip	<i>Rt Honble</i> Right Honour-	
<i>Philom.</i> Philomathes, A	able	
Lover of Learning	<i>Rt. Wpl.</i> Right Worshipful	
<i>Philo-Math.</i> Philo-Mathe-	<i>St.</i> Saint	
maticus, a Lover of the	<i>Sam.</i> Samuel	
Mathematicks	<i>Se^{ct}.</i> Section	
<i>P. M. G.</i> Professor of Music	<i>Sept.</i> or 7ber, September	
at Gresham College	<i>Serj.</i> Serjeant	
<i>Prof. Th. G.</i> Professor of	<i>Serv.</i> Servant	
Divinity at Gresham	<i>Shr.</i> Shire	
College	<i>Shan't,</i> for shall not	
<i>Prisf.</i> Priscilla	<i>Salop.</i> Shropshire	
<i>Pr.</i> Priest	<i>Sol.</i> Solution	
<i>Pf.</i> Psalm	<i>Staff.</i> Stafford	
<i>Q.</i> Queen, or Question	<i>Sp.</i> Spain, or Spanish	
<i>q.</i> quasi, as it were	<i>Sr</i> Sir	
<i>q. d.</i> quasi dicat, as if he	<i>ss.</i> Semissis, half a Pound	
should say	<i>S. S. T. P. A</i> Professor, or	
<i>q. l.</i> quantum liber, as	Doctor of Divinity	
much as you please.	<i>Stew.</i> Steward	
<i>q. s.</i> quantum sufficit,	<i>tho.</i> Thomas	
sufficient Quantity	<i>Thes.</i> Thessalonians	
<i>qr.</i> Quarter, or a Farthing	<i>The.</i> Theophilus	
<i>R.</i> Reason	<i>To.</i> Tobias	

<i>V.</i> Virgin or Verse	Xt Christ
<i>U.</i> Use	Xtopher Christopher
<i>Vid.</i> see	ye the
<i>Ven.</i> Venerable	yn then
<i>Viz.</i> Videlicet, to wit, or	y ^o you
that is to say	ym them
<i>Wm.</i> William	y ^t that
<i>Wp.</i> Worship	yr your
<i>Wthl.</i> Worshipful	Z. Zeal
<i>W. R.</i> William Rex	&, et, and
wn when	&c. & cætera, and the
Xn Christian	rest.

And now having finished my Directions concerning Spelling, Pointing, &c. I shall proceed to give some Instructions in relation to the most useful Art of Writing.

When any Person has thoroughly acquainted himself with Spelling, and understands good *English*, &c. the next step necessary is the acquiring of the accomplishing Art of Fair Writing, to put this Spelling in practice: In order thereto, I shall endeavour to give such Directions, and proper Instructions, as may duly qualify any Person therein.

First, and principally, There must be a fixt Desire and Inclination imprinted in the Mind for its Attainment: For I my self had never acquired, or arrived to any Proficiency in it, if I had not had a strong Desire and Inclination to it; arising from being convinced of its excellent Use in Trade, and all manner of Business; according to the Verse,

*Great was his Genius, most sublime his Thought;
That first Fair Writing to Perfection brought, &c.*

Next

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Next to the Desire, there must be added a steady Resolution to go through with it, till it is gained ; and by a diligent and indefatigable Application, overcome all seeming Difficulties, that may arise in the Progress of its Attainment, agreeable to this Distich ;

*By frequent use, Experience gain its Growth ;
But Knowledge flies from Laziness and Sloth.*

Directions to Beginners.

FIRST, 'tis necessary to be provided with the following Implements ; viz. good Pens, good and free Ink ; and also good Paper, when arrived to commendable Performances ; likewise a flat Ruler for Sureness ; and a round one for Dispatch ; with a Leaden Plummert or Pencil, to rule Lines : Also Gum-Sandrack Powder, (or Pounce, as they call it) with a little Cotton dipp'd therein, which rub gently over the Paper, to make it bear Ink the better ; particularly when full Hands are to be written, such as Text, &c. and especially when you are obliged to scratch out a Word or Letter ; for then there will be a Necessity for its Use : And rubbing the Place with the Pounce, smooth it with the Haft of the Penknife, or clean Paper, and then you may write what is proper in the same Place. These Implements are summ'd up in these Lines :

*A Penknife Razor Metal, Quills good store ;
Gum-Sandrack Powder, to pounce Paper o'er :*

Ink,

*Ink, shining black ; Paper more white than Snow ;
Round and flat Rulers on yourself bestow.
With willing Mind, these, and industrious Hand,
Will make this Art your Servant at Command.*

To hold the Pen.

TH E Pen must be held, somewhat sloping, with the Thumb and the two Fingers next to it ; the Ball of the middle Finger must be placed straight, just against the upper Part of the Cut or Cradle, to keep the Pen steady : The Fore-Finger lying straight on the Middle Finger ; and the Thumb must be fixed a little higher than the End of the Fore-Finger, bending in the Joint ; and the Pen be so placed, to be held easily without griping. The Elbow must be drawn pretty close to the Body, almost to touch it. You must support your Hand by leaning on the Table-Edge, resting on it, half way between your Wrist and Elbow ; not suffering the Ball, or fleshy Part of your Hand to touch the Paper ; but resting your Hand on the End of your little Finger, that, and your Fourth Finger bending inwards, and supported on the Table as abovesaid. So fixed, and sitting pretty upright, not leaning your Breast against the Table ; proceed to the making the small *o*, the *a*, *e*, *c*, *i*, *m*, *r*, *s*, *w*, and *x* ; which must be all made of equal Bigness and Height ; the Distance or Width between the two Strokes of the *n*, must be the same with the Distance or Width of the three Strokes of the *m* ; the same Proportion of width must be observed in the *n*, *w*, and *o*. The Letters with Stems or Heads, must be of equal Height ; as the *b*, *d*, *f*, *h*, *k*, *l*, and *s*. And those with Tails, must be of equal Depth ; as the *f*, *g*, *p*, *q*, and *r*. The Capitals must bear the same Proportion one to another, with
Respect

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Respect to Bigness and Height ; as, *A, B, C, D, E, F, G, H, and I, &c.* — This Proportion of Letters, both of Small and Great, must be observed in, and will serve for, all Hands whatsoever. *N. B.* That all upright Strokes, and those leaning to the left Hand, must be fine or hair Strokes ; and all down-right Strokes, must be fuller or blacker. And when you are in Joyning, where Letters will naturally join, without any straining, take not off the Pen in Writing, especially in Running or Mixt Hands. Care likewise must be duly taken, that there be an equal Distance between Letter and Letter, and also between Word and Word : The Distance between Word and Word, may be the Space that the small *o* takes up ; but between Letter and Letter, not quite so much. Sit not long at writing (that is, no longer than you improve) especially at the first, lest it weary you, and you grow weary of Learning. Imitate the best Examples ; and have a constant Eye at your Copy ; and be not ambitious of writing fast, before you can write well : Expedition will naturally follow, after you have gained a Habit of writing fair and free ; and 'tis much more commendable, to be an Hour in writing six Lines well, than to be able to write sixty Lines in the same Time, which perhaps is perfect scribble, and altogether unintelligible. And besides, by a slow and fair Procedure, you will learn in half the Time : And therefore, 'tis a vain Thought in a Learner, to desire to be quick before he hath acquired Experience, and a Freedom of writing by frequent Practice. If you have Cotton in your Ink, look well that there be no Hairs at the Nib of your Pen. Never overcharge your Pen with Ink ; but shake what is too much into the Ink again. When you leave off, keep your Pen or Pens in Water, till you come to your Writing again.

How

How to make a Pen.

THIS is gained by Experience, and Observation from others that can make a Pen well, than by Verbal Directions. But Note, That those Quills called *Seconds*, are the best, as being hard, long and round in the Barrel ; and before you begin to cut the Quill, scrape off the superfluous scurf with the Back of your Pen-knife, and most on the back of the Quill, that the slit may be the finer, and without Ganders Teeth, (as the roughness in the slit is by some called.) After you have scraped the Quill as above-said, cut the Quill at the End, half through, on the back part ; and then turning up the Belly, cut the other half or part quite through, *viz.* about a Quarter, or almost half an Inch, at the End of the Quill, which will then appear forked : Then enter the Pen-knife a little in the back Notch ; and then putting the Peg of the Pen-knife Haft, (or the End of another Quill,) into the back Notch, holding your Thumb pretty hard on the Back of the Quill, (as high as you intend the slit to be) then with a sudden or quick Twitch, force up the slit ; it must be sudden and smart, that the slit may be the clearer : Then by several Cuts of each side, bring the Quill into equal shape, or form, on both sides ; and having brought it to a fine Point, place the inside of the Nib on the Nail of your Thumb, and enter the Knife at the Extremity of the Nib, and cut it through a little sloping : Then with an almost downright Cut of the Knife, cut off the Nib ; and then by other proper Cuts, finish the Pen, bringing it into handsome shape, and proper Form : But meddle not with the Nib again, by giving it any Trimming or fine Cuts ; for that causes a Roughness, and spoils it .
But

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But if you do, to bring the Nib even, you must Nib it again, as above directed.  *Note*, That the Breadth of the Nib must be proportioned to the Breadth of the Body, or down-right black strokes of the Letters, in whatsoever Hand you write, whether Small or Text. *Note also*, That in your sitting to write, you place your self directly against a fore-right Light, or else to have it on your left Hand, (which I esteem best); but by no Means to have the Light on your right Hand, because the shadow of your Writing-Hand will obstruct your sight, and therefore is very improper. And therefore, methinks, all Persons in fixing up their Accompting-Houses, should have a particular Regard to their Situation, in respect to what was before-mentioned.

Thus far for Direction. Now for Application : I have here set Copies of the most usual, fashionable, and commendable Hands for Business ; with Alphabets of Great and Small Letters, proper to each. Be sure you make your Letters well, (both Small and Great) before you proceed to Joyning. Be careful in Imitation, and observe the foregoing Directions, and without Doubt you will gain your End. Command of Hand, or the Art of striking Letters, &c. is gained by frequent Practising after good Examples.

A

Flourishing Alphabet.

3

A B C D E F G H

I K L M N O P

Q R S T U V W X Y Z



Secretary Hand.

A B C D E F G H I K L M N
O P Q R S T U V X Y Z

A a B b C c D d E e F f G g H h I i J j K k L l
M m N n O o P p Q q R r S s T t U u V v W w X x Y y Z z

Fear God and Honour the King.

A B C D E F G H I K L
M N O P Q R S T U V
W X Y Z Æ

a b c d e f g h i k l m n o p q r
s t u v w x y z &

N. B. 'Tis necessary for all those who would qualify themselves for Business, often to Imitate this Print-Hand; to make clean Marks on Bales, or plain Directions on Parcels.

Copies in Prose, and clinking, in Alphabetical Order.

A

AR T is gained by great Labour and Industry.
 A covetous Man is always, as he fancies, in want.
 Add to your Faith Virtue, and to Virtue Knowledge.
 A blind Man's Wife, they say, needs no painting.
 A comely Countenance is a silent Commendation.
 A Place of ill Example may endanger a good Man.
 A prudent Man values Content more than Riches.
 A virtuous Mind is rather to be chosen than Promotion.
 A fair Piece of Writing is a sort of speaking Picture.
 All mundane Things run a continual Round.
 Authority is the main Point in Government.
 All God's Commandments keep most divinely pure.
 A Man's Manners oft-times forms his Fortune.
 A great Lyar is seldom believed, though he speaks Truth.
 All evil Things and vain, strive ever to refrain.
 A virtuous minded Youth, will ever love the Truth.
 A prudent Youth and wise, will not Advice despise.
 All you that write well, strive others to excel.
 Abundance ruins some, but want makes all to moan.
 Amendment still should shine, in all and every Line.
 A greater Loss can't be, than that of Liberty.
 A good and virtuous Lad, will shun what e'er is bad.
 Abundance proves a Snare; but most of Want are 'ware.
 All Idleness avoid; by it most are destroy'd.
 All idle lazy Boys, obstruct their Parents Joys..
 A Man by Conduct may, keep Misery away.
 All Mishap hath been occasion'd by our Sin.
 Avoid th' Occasion still, of running into Ill.
 A Youth that would transcend, must ever mind to mend.
 A Lad that would excel, must mind his Copy well.

Bounty

B

Bounty is commendable in some, but it ruins others.
By a commendable Deportment we gain Reputation.
By Delight, and some Care, we come to write fair.
By Diligence and Industry we come to Preferment.
Beauty without Virtue, is but a painted Sepulchre.
Beauty commands some, but Money all Men.
By constant Amendment we rise to Preferment.
Brave Men will do nothing unbecoming themselves.
Be wise and beware; of blotting take Care.
Bounty is more commended than imitated.
By Iniquity and Sin, Misfortunes enter in.
By Idleness and Play, Youth squander Time away.
Barren are those Joys, we waste away in Toys.
Bless'd are their Joys above, who do their Time improve.
Badness brings all Sadness, therefore follow Goodness.
By trusting to To-morrow, Men plunge themselves in
(Sorrow.

Be wise betimes; shun darling Crimes.

C

Contentment is preferable to Riches and Honour.
Can they be counted wise, who Counsel despise?
Care mixed with Delight, will bring us soon to write.
Consider the Shortness of Life, and Certainty of Death.
Contentment is a Gem beyond a Diadem.
Competency with Content is a great Happiness.
Contention and Strife, make uneasy our Life.
Courtiers receive Presents in the Morning, and forget
(em by Night.

Caution and Care, oft baffle a Snare.

Contentment makes a Man happy without a Fortune.
Censure no Man, nor detract from any Man.

D

Deride not Infirmities, nor triumph over Injuries.
Delight and some Care, will make you write fair.
Delight in Virtue's Ways, and then you'll merit Praise.
Death

44 *The Young Man's best Companion.*

Death conquers potent Princes, and their Powers.

Delight in what you undertake to learn.

Duty, Fear, and Love, we owe to God above.

Death is before the old Man's Face, and may be at
(the young one's Back.

Death only can declare, what Dust the Bodies of all
(Mortals are.

Drinking is the Drowning of Cares, not the Cure of them.

Death destroys not the Soul ; but an ill Life does.

Do to others as you would, that they unto you should.

Delay is the Remora to all good success.

Deprive no Person of his lawful Due, lest they should
(do the same by you.

Delight and Pleasure's but a golden Dream.

Death is less fear'd by a Fool than a Philosopher.

E

Endless Joys have those, whose sins are vanquish'd Foes.

Every Plant and Flower, shews to us God's Power.

Example oft doth rule, the wise Man and the Fool.

Examples oft prevail, when Arguments do fail.

Every idle Thought, to Judgment must be brought.

Every sluggard is the Cause of his own Misfortune.

Envious Men do fret, when they see others get.

Evil Company makes the good bad, and the bad worse.

Experience is the best Looking-Glass of Wisdom.

Even at Head and Feet, besure your Letters keep.

Endeavour to do well, and then you may excel.

Every Man is right, that mixes Profit with Delight.

Evil Men and Sly, take Care how you come nigh.

Envy and Care, make the Body grow spare.

Every money'd Man, hath others at Command.

F

Fair Words commonly drefs foul Deeds.

Fair Faces have sometimes foul Conditions.

Few do good with what they have gotten ill.

Future Events must be left to Providence.

Fools

The Young Man's best Companion. 45

Fools are rul'd by their Humour, but wise Men by
(Interest.

Firm keep your Mind, on Things that are sublime.

Fear is a good Watch-man, but a bad Defender.

Fate will still have a kind Chance for the brave.

Fraud in Childhood will become Knavery in Manhood.

Fear without Hope turns to Despair.

Faith and Hope are both dead when divided.

Fortune at some Hours to all is kind.

Feign'd Looks oft hide what the false Heart doth know.

Fortune and Fame, create a great Name.

Friends in Adversity are not often found.

Fools and Knaves are not Companions for honest Men.

Frugality and Industry are the Hands of Fortune.

G

Godliness with Contentment is great Gain.

Good Manners in a Lad, will make his Parents glad.

Great Minds and small Means ruin many Men.

Good Manners, Grace and Truth, are Ornaments in
(Youth.

Good Men as well as bad, have sometimes Fortunes sad.

Great good you sure will find, if you are well inclin'd.

Godliness hath the Promise of the Life that now is, &c.

God's Works only are Perfect in their Kind.

Gluttony ransacks Noah's Ark for the Riot of a Meal.

Grief nourish'd in your Breast, will never let you rest.

Greater Profit doth alway come of Learning than of
(Play.

Great Men, tho' they shou'd, are not always good.

Good Men are safe, when wicked ones are at odds.

Get what you get honestly, and use it frugally.

God is Omnipresent, True and Almighty.

H

Hasty Resolutions are seldom Fortunate.

Haste makes Waste of Paper, Ink and Time.

He that stumbles, and falls not, mends his Pace.

Honour

sc

46 *The Young Man's best Companion.*

Honour and Renown, will the ingenious Crown.
Hypocrites first cheat the World, and at last themselves.
Human Life will human Frailties have.

Honour that is true, 'tis lawful to pursue.

He that sends a Fool of an Errand, ought to follow
(him.

Honours are Burdens, and Riches have Wings.

He is a wise Security that secures himself.

He that sins against Conscience, sins with a Witness.

Honour the hoary Head, that Virtue's Paths doth tread.

Happy are their Joys, who turn away from Toys.

Hours fly swift away; improve each Moment of the
(Day.

He that swims in Sin, must sink in Sorrow.

He that fears not an Oath, will not tremble at a Lye.

He hath his Work half done, that hath it well begun.

I

Instruction, and a good Education, is a durable Portion.

Ignorance is the greatest Enemy to Learning.

In praising sparing be, and blame most sparingly.

Imaginary Toys, do please some idle Boys.

Intemperance is attended by Diseases, and Idleness
(with want.

It is good to have a Friend, but bad to need him.

Idleness and Sloth, decreaseth Learnings Growth.

Innocency need not fear the Lyon, or the rugged Bear.

It is better to be unborn, than untaught.

It's too late to spare, when the Bottom is bare.

Idleness hath no Advocate, but many Friends.

Improvement of Parts, is by Improvement of Time.

If you'd win a Pen of Gold, first learn well the Pen
(to hold.

It's the Work of an Age, to repair the Miscarriage of
(an Hour.

Keep

K

Keep a close Mouth, if you'd have a wise Head.
Kings, as well as mean Men, must die.
Kings may command, and Subjects must obey.
Kingdoms and Crowns must in the Dust be laid.
Knowledge sublime, is gained by much Time.
Keep at a Distance from Company that's ill.
Keep good Decorum in your Words and Deeds.
Keep close your Intention, for Fear of Prevention.
Kings may win Crowns, but cannot conquer Death.
Keep Faith with all Men, and have a Care of a Lye.
Keep good Company, if you'd keep a good Name.
Knowledge, if abus'd, is like a Gem ill us'd.
Kingdoms bring Care, and Crowns are heavy Things
(to wear.

Keep out evil Thoughts by entertaining good ones.
Kind Actions neglected, makes Friendship suspected.
Keep safe good Counsel, and entertain not ill Advice.
Kindle not Passion's Fire; it burns with dreadful Ire.

L

Learn to live, as you would wish to die.
Love and Honour will bear no Rivals.
Learn to unlearn what you have learnt amiss.
Learn now in Time of Youth, to follow Grace and Truth.
Liberty is grateful to all, but destructive to many.
Lying is the Duty of none, but the Custom of many.
Learning do but love, and then you will improve.
Liberality without Discretion, becomes Profuseness.
Let no Jest intrude upon good Manners.
Learn now in youthful Prime, to husband well your
(Time.

Learn how to make, as well as use a Pen.
Liberality should have no Object but the Poor.
Lost Opportunities are very rarely, if ever recovered.
Let not the Work of to-day, be put off till to-morrow.
Laugh not out of Measure, nor out of Season.

Money

48 *The Young Man's best Companion.*

M

Money makes honest Men and Knaves, Fools and Philosophers.

Monuments of Learning, are the most durable.

Many know Good, but do not the Good they know.

Make use of Time now whilst you're in your Prime.

Money commonly corrupts both Church and State.

Many think not of Living, till they can live no longer.

Money pleads all Causes, and defends all Titles.

Many when they have fill'd their Bellies, complain of
(weak Stomachs.

Measure not Goodness by good Words only.

Marriage is out of Season, if we are either too Young
(or too Old.

Most precious Time esteem, which no one can redeem.

Many live Beggars all their Life, that they may not
(die so.

Money makes some Men mad, many merry, but few sad.

Many are led by the Ears, more than by the Under-
(standing.

Most precious Things are still possess'd with Fear.

Many are made Saints on Earth, that never reach
(Heaven.

Men of Intrigue commonly sail with all Winds.

Money answers all Objections, and removes all Scruples.

Money and Poverty make great Knaves and little ones.

Misfortune is the Touchstone of Friendship.

Marriage, say some, breeds Cares and Cuckolds.

Mend your Manners and that will mend your Fortune.

Many want Help that have not the Face to ask it.

Momentary and vain, is all earthly Gain.

N

Nothing is constant in this uncertain World.

Necessity is commonly the Mother of Invention.

Next to a good Conscience, prefer a good Name.

None so high can be, as no Misbap to see.

Nothing

Nothing is so hard but Diligence may overcome.
No Task's too hard, when Heaven's the Reward.
None can lay himself under an Obligation to do *ill*.
Never lament or weep, for *loss* of what you cannot keep.
Noise and Talk without some *Rule*, doth indicate that
(Man a Fool.

Nature seldom changes with the Climate.
Never study to please others, and thereby ruin yourself.
Nature's oldest Law we find, is that we to ourselves
(be kind.

O

Opportunity neglected brings severe Repentance.
On present Time depends our future State.
Opus and *Ufus*, as we read, are sometimes Latin for
(our Need.

Of what gives most Delight, we soonest lose the sight.
Omitting doing good, is a committing Evil.
Orators are more solicitous to speak *well*, than to do so.
Our Sand doth run apace, and soon we end our Race.
Our Inclinations get the Rein, to gain a Point we
(should restrain.

Our Minds must be cultivated, as well as our Plants.
Other Peoples Death should be Memento's to our own.
Our early Care should be, to live most piously.
Our Time of Life is call'd a Span, by which observe
(how frail is Man.

One false Step, sometimes, prevents another.

P

Provide against the worst, and hope for the best.
Poor Men want many Things, but covetous Men all.
Patience and Time run thro' the roughest Day.
Put to your Tongue a Bridle, that it talk not idle.
Pain, Disgrace and Poverty, have frightful Looks.
Prayers and Provender hinder no Man's Journey.
Put not off the main Business of Life, to the very Article
(of Death.

D

Pain

50 *The Young Man's best Companion.*

Pain we can count, but Pleasure steals away.
Poor Freedom is better than rich Slavery.
Patience is the Lord of the lean Meat of Adversity.
Passion and Partiality govern in too many Cases.
Perfection in this World, is Virtue ; and in the next
(Knowledge.

Q

Quick Promisers are commonly slow Performers.
Quietness and Content are Mates most excellent.
Qualify exorbitant Passions with Quietness and Pati-
(ence.
Quiet Men have quiet Minds, and enjoy Content.
Quicken Learning with Alacrity and Delight.
Quarrellous Persons sometimes meet with their Match.
Quot Homines tot sententiae, so many Men, &c.
Quills are made for Pens, and Pens for Letters.
Quietly learn to bear a Cross ; if we repine, it's to
(our Loss.
Questions in Jest, no serious Answers need.
Quench Passion's heat ; don't suffer it to reign.
Quantity with some is what they'd hit ; but Quality
(prevails with Men of Wit.

R

Remember your Duty to God, your Neighbour, and
(yourself.
Repentance comes too late, when all is consumed.
Reason should always guide, and o'er our Acts preside.
Reputation is the Darling of human Affection.
Rest continu'd long, makes Idleness grow strong.
Rely on Virtue more than Blood, for that is what you
(shou'd.
Repent to-day, to-morrow may be too late.
Reputation like a Glass, when crackt it will be crasy.
Reputation is gain'd by many Actions, and lost by one.
Remember Death, and do not forget Judgment.
Religion in Hypocrites, is as it were but skin deep.
Relations

Relations and Friends, pursue their own Ends.

Religion hath and doth give Countenance to much
(Wickedness.

Riches serve a wise Man, and rule a Fool.

Run no great Risque for 'vantage small, cho' some for
(Money hazard all.

Reason's Dictates follow still; which if you do, *you'll*
(ne'er do ill.

Righteous Men's Prayers *shall* be regarded.

Repentance is a quite forsaking sin; but he repents
(not, that remains therein.

Resolve to amend, and pursu't to your End.

Review the Time you have mispent; think upon it,
(and lament.

Recreation should fit us for Business, not rob us of
(Time.

S

Sin and Sorrow are inseparable Companions.

Some are too stiff to bend, and too old to mend.

Some *willinglier* discharge a Reckoning, than pay a
(Debt.

Sin is most certain, first Cause of Misfortune.

Study to live quiet, and to do your own Business.

Some in their Zeal are hot, but Knowledge they've not:
Set Bounds to Zeal by Discretion.

Silence is the Sanctuary of Prudence and Discretion.

Sloth is an Argument of a mean and degenerate Mind.

Short, and therefore vain, is *all* Earthly Gain.

Soft Words, sometimes, work upon the proudest Heart.

Sleep and Idleness are Enemies to Learning.

Sin is the Cause of Shame; who love it are to blame.

Small Means and large Minds, ruin many Men.

Short are *all* Extreames, whether of good or ill.

Spend Time in good Duties, and Treasure in good
(Works.

52 *The Young Man's best Companion.*

Some go fine and brave, finely to play the Knave.
Six Foot of Earth, ends *all* Distinctions of our Birth.
Some must dye, that others may live, said the Grave-
(digger.

Silly People are commonly *pleas'd* with *silly* Things.
Some are *full* of *oval* Sanctity, and *mental* Impiety.
Small Profit comes from *all* *ungodly* Gain.

T

Train up a Child in the Love and Practice of good
(Manners.

The end of Mirth is many times the beginning of Sor-
(row.

Time is so swift of Foot, that none can overtake it.
Time passeth swift away, no Mortal can it stay.
Time passeth swift away, improve therefore each Day.
Those who wo'nt 'mend to-day, shall have more Work
(to morrow.

The doing nothing, is very near doing Evil.
The Borrower is a slave to the Lender; and the Secu-
(rity a slave to both.

Truth is the strongest Bands of human Society.
The Endowments of the Mind ought not to be confin'd.
There's no discerning Pate, that can contend with Fate.
The Destruction of the Poor is their Poverty.
The City cares not what the Country thinks.
To do good, is the way to find it. 1726.
'Tis just so much lost as is idly spent.
There is no such Thing in Nature as Perfection.
Time, Tide and Carriers, *will* for no Man stay.
The Unfortunate is insulted by every Rascal.
'Tis inhuman to sport with another's Infirmities.

V

Virtue is first to be sought for, and Money the next.
Vain and Transitory, is all mundane Glory. 1726.
Virtue and Fortune work Wonders in the World.
Value more a good Conscience than a great Fame.

Unwil:

Unwillingly go to *Law*, and *willingly* make an end.

Understanding a Thing, is half doing it.

Variety is the Happiness of Life.

Virtuous and brave Actions gain Reputation.

Use soft Words, and hard Arguments.

Virtue is commended of *all*, but *follow'd* by few.

Unthankfulness is the Cause of the Earth's Unfruitful-
(ness.)

Vain-conceitedness is ridicul'd by *all*.

Virtue is seldom found a Match for Power.

Understand Things not by their Form, but Quality.

Virtue *all* commend, but few do it attend.

Union and Peace, make Discord to cease.

Valour and Greatness, are preferr'd before Neatness.

Vain and foolish Things, Disreputation brings.

Virtuous Actions *will*, bring Reputation *still*.

W

What is more vain, than publick Light to shun.

Who fears no Bad, stands most unarm'd to *Ill*.

What pleases God must be, none alters his Decree.

We are many times deceiv'd with the bare shew of
(Good.)

Women and Wine, tho' they smile, they make Men
(pine.)

When Fortune knocks, be sure to ope the Door.

Wine is a Turn-coat; first a Friend, then an Enemy.

What is violent is seldom permanent. 1. 4. 16. 9.

When good Cheer is lacking, our Friends *will* be
(packing.)

We dance *well*, whilst Fortune plays on the Music.

We keep a better Account of our Money than our
(Time.)

Wickedness in jest, leads us to Wickedness in earnest.

We must not blame Fortune for our own Faults.

Where Knavery is in Credit, Honesty is put out of
(Countenance.)

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We must *look* to Time past, to improve what's to come.
What is fixed in our Hearts, is seldom out of our
(Heads.

Wickedness comes on by degrees, as *well* as Virtue..
Would you be Rich, be industrious; if Wise, be stu-
(dious.

X

Xenophon was a great Captain, as *well* as a Philosopher.
Xerxes wept at the Thoughts that his vast Army would
(be dead in 100 Years.

Xerxes whipt the Sea because it would not obey his
(Command.

Xenocrates, tho' a Philosopher, was very *dull* and *heavy*.
Xenophilus liv'd without sickness One hundred and
(seven Years.

'Xamples of the best for ever mind, and imitate in kind.
'Xpel bad Thoughts, and what is sin, forth of your
(Mind, and let what's good come in.

'Xamine *well* how you improve, for that *will* be as
(you your Learning love.

'Xercise *will* much Improvement gain.

'Xperience is the Mistress of all Arts and Sciences.

'Xcel in what you can, and strive to lead the Van,

'Xpress your Desire to learn by your Diligence.

Y

Youth is *full* of Disorder, and Age of Infirmary.

Young Man lament, your Minutes mispent.

Your Time improve, and squander't not away.

Your Spelling mind, and Sense of what you write.

Yield quietly to what must come unavoidably.

Young Men in Strength should provide against Age
(and Weakness.

Youth in their Prime, should manage *well* their Time.

Youth to the Grave do go, as *well* as the Aged do.

Yield yourself Servant to Righteousness and to Ho-
(liness.
Your

Your Copy mind, write Fair, and of Blotting beware.
Your Care should appear, by writing most fair.
Your Delight and your Care, will make you write
(fair.

Z

Zeal in a good Cause, commands Applause.
Zeal mixt Love, is harmless as the Dove.
Zealously strive, with Emulation write.
Zealously strive for an eternal Crown.
Zeno was the first of the Stoic Philosophers.
Zeal without Knowledge is but Religious Wild-fire.
Zaccheus he was low, but yet his Faith wan't so.
Zeal, if not rightly directed, is very pernicious.
Zealously bend amain, fair Writing to attain.

Short Lines for Text-Hand.

Abandon whatsoever's Ill——Be Wise betimes.
Care destroys the Body——Do the Things that are just.
Expect to receive as you give——Frequent good Company.
Give what you give chearfully——Have good Men in
(esteem.
Imitate that which is good——Keep God's Command-
(ments.
Learn to be wise——Money answers all Things.
Nothing get, nothing have——Observe Modesty.
Pleasures are very short——Pains are very long.
Quit all Revenge——Quiet your Passions.
Recompence a good Turn——Repent of your Sins.
Spare for to live——Sin ve y little.
Time well improve——Turn from your Sins.
Use moderate Pleasure——Use not bad Company.
Vain are some Pleasures——Vile are some Vulgar.
Wisdom is the principal Thing——Wise Men are scarce.
Xenophon and Xendrates——Zeno and Zenobia.

Double Lines in Verse.

All you that in fair Writing would excel,
How much you write, regard not, but how well.
Bear your Pen lightly, keep a steady Hand,
And that's the way, fair Writing to command.
Carefully mend in each succeeding Line,
For that's the way to reach to what is fine.
Descending Strokes are dark, but upwards small ;
Even at Head and Feet keep Letters all.
From Blots keep clean your Book ; and always mind
To have your Letters *all* one way inclin'd.
Grace every Letter with perfect, *full* and *small*,
And keep a due Proportion in them *all*.
Hold your Pen *lightly* ; gripe it not too hard ;
And with due Care your Copy *well* regard.
Join every Letter to its next, with care,
And let the Stroke be admirably fair.
Keep a light Hand, and smoothly glide along ;
Ascending fine, and downwards Strokes are strong.
Let graceful Beauty in each Line appear,
And see the Front do not excel the Rear.
Majestick Grace, beautiful and strong,
Doth, or else ought, to every Line belong.
No rough Edges ever should be seen ;
But *all* the Letters should be smooth and clean.
On Care depends the Beauty of each Line,
For that alone *will* make your Art to shine.
Praise is deserving, to the careful Hand ;
But to the Unthinking, doth Correction stand.
Quit yourself nobly, with a prudent Care,
Of clumsy Writing, and of Blots beware.
Remember strictly what the Art enjoins ;
Equal siz'd Letters, and as equal Lines.

Small Letters must of equal Height be seen ;
The same of Great ; both beautifully clean.
Time and Delight will easy make the Task :
Delight, Delight's ! the only Thing I ask.
Vain are the Hopes of those that think to gain,
This noble Treasure, without taking Pain.
Whilst idle Drones supinely dream of Fame,
The Industrious actually do get the same.
'Xamples of the best, with Emulation, strive
To imitate, and then your Name'll survive.
Youth is the Time for Progress in all Arts ;
Then use your Youth to gain most noble Parts.
Zeal for attainment of each Art should burn
With fervent Warmth, then to account 'twill turn.

Since good Ink is necessary to good Writing, I shall give a Receipt or two for making some of the best Black Ink in the World ; which is as follows, viz.

A Receipt for Black Ink.

TO six Quarts of Rain or River Water, (but Rain Water is the best) put one Pound and half of fresh blue Galls of *Aleppo*, (for those of *Smyrna* are not strong enough) bruised pretty small ; 8 Ounces of Copperas, clean, rocky and green ; also 8 Ounces of clean, bright and clear Gum Arabick ; and 2 Ounces of Roach Allom : Let these stand together in a large stone Bottle, or clean stone Pot, or earthen Pot, with a narrow Mouth to keep it free from Dust ; shake, rowl or stir it well, once every Day, and you will have excellent Ink in about a Month's time ; and the Older it grows, the better 'twill be for use.

Ingredients for a Quart.

1 Quart of Water, 4 Ounces of Galls, 2 Ounces of Copperas, and 2 Ounces of Gum, mixt and stirred as above.

☞ If you seek the green Peelings of *Wall-nuts*, (at the time of the Year when pretty ripe) and Oak Saw-dust, or *small* Chips of it, in Rain Water, and stir'd pretty often for a Fortnight, and then strain'd, and the Water used with the same Ingredients as above, the Ink will still be stronger and better.

How to make Red Ink.

TAKE 3 Pints of stale Beer, (rather than Vinegar) and 4 Ounces of Ground *Brazil-wood*; simmer them together for an Hour, then put in Four Ounces of Roach Allom; and these three are to simmer together for half an Hour; and then strain it thro' a Flannel, or *&c.* then Bottle it up, (well stopp'd) for use.

Or you may dissolve half an Ounce of *Gum Sten: mega* or *Arabick*, in half a Pint of Water; then put a penniworth of *Vermilion* into a small Gallipot, and pour some of the Gum-Water to it, and stir it well, and mix it together with a Hair-pencil, to a proper Consistency; but it will not incorporate presently, but by the next Day it will; then having a clean Pen, dip it into the Ink, having first well stirred it with the Pencil; and then you may use it: It is a fine and curious Red, tho' not so free as the other. And after the same manner, you may make any other coloured Ink, as *Blue, Green, Yellow, Purple, &c.* having
divers

divers Gallipots for that Use. In like manner you may mix the *Shell Gold*, for curious Occasions, pouring two or three Drops, or according to Direction, into the *Shell*, and mix it *well* with a clean Hair Pencil, and with it put a little into a clean Pen, &c. The *small Shells* may be bought at some *Fan-Sellers* or *Fan-Painters*, at two or three for Two-pence; or the large ones, (which are the best) at the *Colour-Shops*, at Six-pence a piece.

To keep Ink from Freezing or Moulding.

IN hard Frosty Weather, Ink *will* be apt to Freeze; which if once it doth, it *will* be good for nothing; for it takes away *all* its Blackness and Beauty. To prevent which, (if you have not the Conveniency of keeping it warm, or from the Cold) put a few Drops of Brandy, or other Spirits, into it, and it will not Freeze. And to hinder its Moulding, put a little Salt therein.

*Familiar Letters on several Occasions, and
on divers Subjects.*

BEfore we enter upon *Arithmetick*, it may be proper to give some Examples of Letters on various Subjects, and upon divers Occasions; which Letters frequently read over, and sometimes copied, it may be a good Introduction to a handsome style of Sense, and to a commendable Manner of Writing; besides the help and use they may be of in noting and observing the Method of spelling good English, and Orthographically

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graphically placing *Great Letters*, or *Capitals*, where they ought to be ; and also an imprinting in the Mind the due Notion of Points, Stops, &c. and when and where to be made.

Letters are variously Worded, and ought properly to express the Desires, Thoughts, &c. of the Writer to the Reader, that thereby the Receiver of the Letter may fully understand, and be justly inform'd of the Occasions, Wants, or Intentions of the Sender.

Letters being writ on divers Subjects, and on sundry Occasions, they may be ranked under these Denominations or several Heads following, viz. *Letters of proffered Assistance*, *Letters Consolatory*, *Letters of Thanks*, *Letters Congratulatory*, *Ditto of Reproof*, *Ditto of Excuse*, *Ditto Accusatory*, *Ditto of Advice or Counsel*, *Ditto of Recommendation*, *Ditto Exhortary*, *Ditto of Remonstrance*, and *Letters of Visit*, properly called *Familiar Letters* ; *Letters of Business* ; and lastly, *Mixed Letters*, that is, on various Subjects, and different Affairs.

I shall not have Room to touch upon every one of these particularly : But I shall give sundry Examples promiscuously exhibited, and are such as these that follow, viz.

A Letter from a Son to his Father.

London, 6th Dec. 1726.

Honoured Father,

WITH all dutiful Respect, I trouble you with these Lines, to enquire of the good State of your Health, (of which I should be extremely glad to hear) and to present you my most humbly Duty, and Tenders of filial, and most affectionate Service. I have not had the favour of any Letter from you since that from you dated the 8th of *October* last, which I reply'd

ply'd to the very next Post, and in such Particulars as you enjoyn'd me. I have sent you, Sir, by *Samuel Simple*, the *Pemsey* Carrier, a Spaniel Dog, which is an excellent good one of his Kind, and fit for the Sport of your Place; his Name is *Tray*, and is very free for the Water; and if he hath any Fault, it is a being a little too eager; but he is young, and may be brought to what you'd please to have him. I hope my Sister *Mary* is well, to whom pray give my kind Love, and also to be pleas'd to accept of my Duty to yourself, which is the Present needful from,

Sir, Your most dutiful Son,

and humble Servant,

Anthony Addlehill.

The Answer.

Pemsey, 28 Xber, 1726.

Dear Toney,

I Received your Letter of the 6th Instant, and I take notice of your dutiful Respect and kind Wishes for my Health, which, I thank God, I perfectly enjoy at present, as I wish and hope you do yours.—I recd. your Present of the Dog; but the poor Cur was almost starv'd, having (as I suppose) had nothing on the Road; but he is now in good Condition, and hath been try'd as to his Mettle, and find he is a good one. I have sent you by the Carrier half a dozen Wild Ducks, which *Tray* fetcht when I had shot them. Your Sister *Molly* remembers her kind Love to you, and hath sent you a Turkey, and a Chine of Bacon, to which I wish you (and your Friends, if you invite any) a good Stomach. With my Blessing and Prayers to God for you, concludes your Tender and very

Loving Father,

Andrew Addlehill.

We

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We have a great many Wild Fowl in our Level, so that you may expect another Present of that kind in a little time.

Note, That those four short Lines are called the Postscript, because they are writ after, when the Body of the Letter is done.

A Letter from a young Man to his Uncle.

Honoured Uncle,

Norwich, Dec. 7th, 1726.

S I R,

THE many kind and courteous Things that you have done for me, oblig'd me in Point of Gratitude, as well as Duty, to return you my most humble Thanks, and to offer you my poor, but real and hearty service, in the Affair between you and Mr. A. B. of this Place: And if you'll please but to communicate to me your Intentions, and give me your Directions therein, I shall observe and follow them with all punctuality; and will from Time to Time give an exact Account of my Negotiations in that Affair. So expecting to receive your Commands by the first convenient Opportunity, I rest and remain,

Sir, Your most obliged Nephew,

and very humble Servant,

Brian Bing.

The Uncle's Answer.

London, 12th Dec. 1726.

Nephew,

I Take your Offer of Service to me in the Business between me and Mr. A. B. of your City very kindly, and think none fitter to adjust that Affair than your-

yourself; but I am *unwilling* to go to Law, and had rather, much rather, that you would endeavour to bring him to some reasonable Accommodation; for, in such Contests the Winner is a Loser at the upshot. So if I can bring him to any reasonable Terms, I *shall* be very glad: You understand the Affairs, and so I *shall* commit it *wholly* to your discreet and good Management, being persuaded that you'll do for me as for yourself: So I remain your Loving

and Affectionate Uncle,

Basil Bring.

A Letter from a Niece to her Aunt.

Madam,

London, 7th Dec. 1726.

THE Trouble I have already given you, puts me to the Blush, when I think of intruding again on your Goodness; but Necessity, that frequently puts us upon what we have not always a mind to, and forces us against our Inclinations, which is now the Motive that induces me to be thus troublesome. Pray, dear Madam, excuse me, if I once more beg your Assistance in this time of my unlucky Misfortune, and I *shall* ever have a grateful Remembrance of your Goodness to me; and I hope I *shall* be one time or other in a Capacity of making some Returns of the many Obligations your Goodness hath conferred upon me your most respectful Niece,

and humble Servant,

Penelope Pinch.

A Letter of proffer'd Assistance to a Friend.

Dear Friend,

I Should be false to true Friendship, if I should neglect or cast off my Friend in Adversity; I
hearing

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hearing that you are under some Misfortune, and at present somewhat pinch'd with Want, I send you these Lines for your Consolation, desiring you to bear up against your ill Luck with as much Presence of Mind as you can; for assure yourself, I shall suddenly follow this Epistle in Person, and come, I hope, opportunely enough to your Assistance; till which time, take Courage, and be assur'd that you shall not be disappointed of timely Help from, dear Friend,

Tours in Reality,

Timothy Timely.

A Brother to a Sister.

Dear Sister,

THE great Distance and long Absence of me from you (tho' I have not wanted good Company) makes me very solicitous concerning your Welfare; Natural Affection inclines me strongly to have you in Remembrance, tendering your Health and Welfare in every respect as dear as my own; and there is nothing at my Command; but, if you request, it shall be freely yours. Notwithstanding the Distance, I purpose (God willing) to make you a Visit very shortly, and had done it before now, but an urgent Occasion interpos'd, the Particulars of which being too long for a Letter, I shall acquaint you of when I see you: Pray give my due Respects to all Friends, particularly to honest Mr. S. T. and so in a hopeful Expectation of finding you all well at my Arrival, I conclude, and remain,

Dear Sister,

Your affectionate Brother,

and humble Servant,

Henry Hearty.

A Letter from a Youth at School to his Parents.

London, 6th Dec. 1726.

Honoured Father and Mother,

I Received your kind Letter of the 4th of November past, and also the several Things therein mention'd, by the *Chichester* Carrier, for which I return you my most humble and hearty Thanks, they coming very seasonably to the Relief of my Occasions.—I begin to make pretty good Improvement in my Learning now, (tho' at the first it seem'd a little irksome and hard) and I hope to gain the Point at last for which you sent me hither. Pray, dear Parents, accept of my most humble Duty to yourselves, and kind Love pray remember to my Brothers and Sisters, and to my quondam *Play-fellows*, particularly to *Jackey-Gingle-brains*, and tell him I hope by this time he begins to be a little serious. — This being all at present from,

Honoured Parents,

Your dutiful Son, and humble Servant,
Stephen Studious.

From an Apprentice to his Friends.

Honoured Father and Mother,

BY these I let you know, that by your good Care and Conduct I am *well* settled, and am very *well* pleased with my Station, and could not but in Duty return you my hearty Thanks in a grateful Acknowledgment of your Love and tender Care of me; I *will* endeavour to go thro' my Business *cheerfully*; and having begun *well*, I hope I *shall* persevere to do so to the End, that I may be a Comfort to you hereafter,

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after, and in some measure make a Return of your Love and Kindness to me, who am

Your most dutiful and obedient

Son and Servant,

Daniel Diligent.

A Letter of Recommendation.

S I R,

THE Bearer hereof, *Francis Faithful*, I send to you as one whose Honesty you may rely on, and my Experience of his Conduct and Fidelity gives me a certain kind of Confidence in recommending him to you; but you know me, Sir, and I believe you cannot in the least think that I would recommend any one to you, that I had the least Umbrace of Suspicion or Doubt concerning their Probity. I am with due Respect,

Sir, Your real Friend,

and humble Servant,

George Generous.

A Daughter to a Mother, in relation to Marriage.

Honoured Mother,

WITH all Duty, Humility and Respect, I address myself to you in these Lines, hoping they will find you in perfect Health both of Body and Mind, for which I am never wanting in my Prayers to implore. As I would act nothing that is very material, without your Knowledge, Consent and Approbation, I thought it my Duty to acquaint you of a Matter of the greatest Weight and Importance, pardon me if I blush to name it, *viz.* that of my Marriage; the Person (as I think) is well deserving of me, or one much

much better ; it is Mr. A. B. of C. you know both him and his Character, viz. one sober, diligent, and good humour'd ; but however I shall submit to your good Pleasure and Guidance in an Affair of such momentous Concern, and remain,

Honoured Mother,

Your dutiful Daughter,

and very humble Servant,

Mary Modesty.

To a Country Chapman.

Mr. Francis Fairdealer.

London, 8th Dec. 1726.

S I R,

YOU and I have formerly had Trading together, and it is not my Fault that we do not continue so to do ; for assure yourself, I have a great Value and Respect for you, and on that account none shall be more ready to oblige you in what I may ; and pray let us once more reassume our Dealings together ; and you shall find, that for any Goods you have occasion for in my way, none shall use you more kindly than,

Sir,

Your real Friend, and humble Servant,

Titus Tradewell.

A Letter of Congratulation.

S I R,

IF you were but sensible how sensibly I am affected with the good and most acceptable News that I hear of your good Fortune, you would conclude that the Joy that surprizes me for the same, is equal to yours that enjoy so happy a Turn of Providence : I could express myself further on this Theme, and enlarge exceedingly on so pleasing a Subject ; but let
this

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this at present suffice, *till* I have a more favourable Opportunity of expressing my Joy to you Personally ; in the interim I am truly,

Sir,

*Your sincere Friend, and
very humble Servant,*

Ralph Real.

A Letter of Enquiry of Health.

Hammersmith, 9th Octob. 1726.

S I R,

I Not hearing from you in such a length of Time as from the 12th of *June* last to this Time, I am therefore under great Concern for you, lest some Misfortune of Sickness, or some other Accident, hath happened to you, or to some one of your Family ; my Uneasiness thereon, occasions my giving you the trouble of these Lines, which I wish may find Things with you better than my Fears suggest ; however, to put me out of Pain, be pleas'd to let me know the Certainty with what convenient Speed you can ; and thereby you'll very much oblige,

Sir,

Your cordial and real Friend,

and very humble Servant,

Peter Pitifull.

A Letter by way of Petition to a Friend.

Honoured Sir,

I Am uncertain whether my late Misfortunes have come to your Knowledge ; however I most humbly presume on your good Nature, being assured by sundry Examples of your Compassion, that you *will* think of, and take pity on the Distressed ; therefore, as an Object truly deserving Compassion, I most humbly

bly implore, and petition you to consider the many Losses and Disappointments that I have met with in my unlucky and wayward Fortune, which have reduced me to such necessitous Circumstances, that I cannot possibly proceed in my Affairs : You was pleased once to stile me your Friend, and so I was indeed ; and so I would most certainly be now, and shew it by a signal Proof of Kindness, if our Circumstances were changed, by standing between you and Misfortune, and screening you from the malevolent and inauspicious Influences of cross-grain'd Stars. I doubt not, Sir, but your Generosity and Goodness is as great ; and, I hope, with all Humility you will be pleased to interpose your good Offices, &c. between unlucky Fortune and,

Sir,

Your very humble Servant,
Laurence Luckless.

A Letter of Friendship.

Dear Friend,

IT is now a long Time (as I account it) since you and I have had any mutual Converse by Letter, which to me is a great Unhappiness ; and really, if Distance did not somewhat excuse, I should be apt to tax you with Unkindness ; but however, perhaps you may not have the same Conveniency of Writing at your Place (for want of Postage) as we have at ours, and on that account I shall not insist on your Infringement of Friendship, but the chief Purpote of these is to enquire of your Welfare, and to have an Answer given to,

Sir,

Your real Friend,

and very humble Servant,

Kendrick Kindly.

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A Letter of Correspondence.

Sir,
Yours of the 5th ult. is now before me ; in answer to which, I positively declare, That Mr. A. B. hath not been with me to present the Bill of Exchange that you mention in your Letter of Advice to me, and therefore there can be no just Cause of Protest, or any other Charge, put on,

Sir, *Your humble Servant,*
John Innocent.

It is as proper to know how to Subscribe, and how to Direct, as it is to write a Letter.

Superscriptions.

To his most Excellent Majesty ; or, To his most Sacred Majesty, &c. To the Queen's most Excellent Majesty.
To the Prince, To his Royal Highness, &c. To the Princess, To her Royal Highness, &c.

To Spiritual Lords.

To his Grace the Lord Arch-Bishop of Canterbury ; or,
To the most Reverend Father in God, &c.

To other Bishops.

To the Right Reverend Father in God, &c.

To the Inferior Clergy.

To the Reverend Mr. A. &c. or, To the Reverend Doctor, &c.

To Temporal Lords.

To his Grace the Duke of, &c. To the Right Honourable the Marquis of Halifax. To the Right Honourable the Earl of Sussex. To the Right Honourable the Lord Viscount Ashburnham.

The Sons of Nobility.

Must be dignified (tho' not immediate Heirs) with the Title of Honourable, as being their due by Birth.
To

To a Baronet, *Honourable* by Virtue of his Patent, or *Right Worshipful*; and also to a Knight, *Right Worshipful*. To an Esquire, *Worshipful*.—Every Privy-Councillor, tho' not a Nobleman, hath the Title of *Right Honourable*. All Embassadors have the Stile of *Excellency*; as hath also the Lord Lieutenant of Ireland, and the Captain General of his Majesty's Forces. The Lord-Mayor of London, during his Mayoralty, hath the Title of *Right Honourable*. And the Sheriffs, during that Office, have the Stile of *Right Worshipful*. All Mayors of Corporations have the Title of *Esquires* during their Office.

For the Beginning of Letters.

To the King; *Sir*, or *May it please your Majesty*.

To the Queen; *Madam*, or *May it please your Majesty*.

To the Prince; *Sir*, or *May it please your Royal Highness*.

To the Princess; *Madam*, or *May it please your Royal Highness*.

To a Duke; *My Lord*, or *May it please your Grace*.

To a Dutcheſs; *Madam*, or *May it please your Grace*.

To a Marquis; *My Lord*, or *May it please your Lordſhip*.

To a Marchioness; *Madam*, or *May it please your Ladyſhip*.

To an Earl, Viſcount, or Baron; *Right Honourable*, or *May it please your Lordſhip*.

To their Conſorts; *Madam*, or *May it please your Ladyſhip*.

To a Knight; *Sir*, or *Right Worshipful*.

To his Lady; *Madam*, or *May it please your Ladyſhip*.

To a Mayor, Juſtice of the Peace, Eſquires, &c. *Sir*, or *May it please your Worſhip*.

At Subſcribing your Name, conclude with the ſame Title you began with: as, *My Lord*, *Your Lordſhip*, &c.

of

Of Secret Writing.

HERE it may not be improper to say something of Secret Writing; to which Bishop *Wilkins*, in his Book of *Mathematical Magick*, speaks largely; but it is principally concerning Writing in Cypher, which requires great Pains, and an uncommon share of Ingenuity, both in Writers and Readers. But however, I shall shew two or three particular Ways, that are very pretty, and amusing, and also very easy, both as to Cost and Pains. And,

First, If you dip your Pen in the Juice of a Lemon, or of an Onion, or in your own Urine, or in Spirits of Vitriol, and write on clean Paper whatever you intend, it *shall* not be discerned *till* you hold it to the Fire, and then it will appear legible. And if with any of the aforementioned, you write on your Skin, as on your Arm, or Back of your Hand, &c. it shall not be seen *till* you burn a piece of Paper, and with the Ashes rub on the Place, and then it *will* appear very plain: And this I have experienc'd and try'd, and therefore can say, *Probatum est*.

Another Way is, When you write a Letter that you intend it shall not be discovered, but to those you think fit; is first to write your Thoughts on one side of your Letter with black Ink, as usual, (but it ought to be on thin Paper) and then on the contrary side, go over the said Matter that you would have secret, with a clean Pen dip'd in Milk; and that Writing *shall* not be read without holding it to the Fire, as mentioned above, and then it *will* appear legible in a bluish Colour.

A third Method, is to have two Pieces of Paper of equal size, and the uppermost cut in checquered Holes or Squares, big enough to contain any Word of six or seven

seven Syllables, and in those Squares write your Mind in regular Sense; and then take off the said checquered Paper, and fill up the Vacancies with Words of any Kind, which will render it perfect Nonsense, and not capable of being read, to any purpose of Intelligence. And transmit or send the said uppermost, or Checquered Paper, or another exactly of the same Form, to your Correspondent; whereby he shall, by laying it nicely on your said Letter, read your intended Sense, without being perplexed with the Words of Amusement intermixed, which makes it altogether unintelligible.

Or again, You may write to your Friend in proper Sense with common Ink, and let the Lines be at so commodious a Distance, that what you intend to be secret may be written between them with Water, wherein Galls have been steeped a little time; (but not long enough to tincture the Water) and when dry nothing of the Writing between the said Lines can be seen; but when it is to be read, you must with a fine Hair Pencil dip'd in Copperas Water, go between the said Lines, and so you make it legible. *Note*, This Way will give no Ground for Suspicion, because the Letter seemeth to carry a necessary Sense in those Lines that are set at such a proper Distance, &c.

Of ARITHMETICK.

AFTER Writing, the next necessary Step towards qualifying a Person for Business, is the Understanding that truly laudable and most excellent Accomplishment, the noble Science of *Arithmetick*; a Knowledge so necessary in all the Parts of Life and Business, that scarce any thing is done without it.

In my Directions for its Attainment, I shall proceed with such Plainness of Method, and Familiarity of Stile, as shall render it easy to be understood, and conspicuous to the meanest Capacity.

And first of *Notation* and *Numeration*.

In *Notation*, we must note or observe that all Numbers are expressed by, or composed of, these Ten Figures or Characters following, viz.

One, Two, Three, Four, Five, Six, Seven, Eight, Nine, Cypher.

1 2 3 4 5 6 7 8 9 0

Nine of these are called significant Figures, to distinguish them from the *Cypher*, which of itself signifies Nothing; but as it is placed (in whole Numbers) serves to increase the Value of the next Figure or Figures that stand before it; as 3 is but Three; but before the *Cypher* thus, 30, the 3 becomes Thirty, &c. But in Decimal Fractions the (0) decreases the Value of the Figure behind it; for therein, 3 is three Tenths of any thing; but by placing, 0, before it, thus, 03, it is decreased from 3 tenth Parts to 3 hundredth Parts of any thing, &c. — We are to Note, That every one, or any, of the above mentioned Nine Figures, or Digits, have two Values; one certain, and another uncertain; the certain Value is, when it stands alone by itself; the uncertain is, when joined or placed with other Figures or Cyphers; for when any one of these Figures stand alone, they signify no more than their own simple Value; as 5 is but Five, 4 but Four, 6 but Six, and 3 no more than Three, &c. And this is the certain Value of a Figure: But when another Figure or Cypher is annexed, they then are increased in their Value ten times; as 5, or 5 Units, or Ones, to 5 Tens or Fifty, 4 to 4 Tens or Forty, 6 to 6 Tens or Sixty, and 3 to 3 Tens or Thirty; as thus, 51, Fifty-one; 42, Forty-two; 63, Sixty-three; 34, Thirty-four, &c. Again, if any of the said Figures stand

For the easier Reading of any Number, first get the Words at the Head of the Table by Heart ; as Units, Tens, Hundreds, Thousands, &c. and apply'd thus, 75, five Units, Five, and 7 Tens, Seventy, that is, Seventy-five. Again, 678 ; 8 Units, Eight, 7 Tens, Seventy ; and 6 Hundreds, six Hundred ; that is, Six hundred seventy eight. Once more, 3456 ; 6 Units, six ; 5 Tens, fifty ; 4 Hundreds, four hundred ; 3 Thousands, three thousand ; together, Three thousand four hundred fifty-six. Read the 4th Line of the Table downwards, viz. 123456789 ; here the Valuation of the Figures is from the Right-hand to the Left, as 1 in the ninth Place is Hundreds of Millions ; but to be read from the Left-hand to the Right ; thus, One hundred twenty-three Millions, four hundred fifty six Thousand, seven hundred eighty nine. But any Number may yet be read more intelligibly, viz. by Stops, thus ; make a Comma after every third Figure or Cypher, beginning at the Right-hand, and so on towards the Left, making a Stop after every third Figure or Cypher, as abovesaid ; thereby distinguishing every third Place into Hundreds, as Hundreds of Units, Hundreds of Thousands, Hundreds of Millions, and Hundred thousands of Millions, &c. And for Tryal let's read the first Line of the Table ; the last Place in Valuation is Hundred thousands of Millions, and to be pointed into Periods thus, 123,456,789,012 ; and read thus, One hundred twenty-three thousand, four hundred-fifty six Millions, seven hundred eighty nine thousand, and twelve ; that is, no hundreds, but twelve. Again, read the following Number, viz. 276,245,678,921,460 ; here the first Point or Period is betwixt 4 and 1, and the last betwixt 2 and 6, and to be read thus ; 276 Millions of Millions, 245 Thousands of Millions, 678 Millions, 921 Thousands, 460 Units or Ones. And thus may any Number be read with ease, though

though a large one: And thus are large Numbers or Sums expressed, or set out, in the Exchequer, Bank, Lottery Tickets, &c. as Thus N^o. 224, 156,—19,478—and 420,000, &c. The foregoing Table of Numeration is on the Right-hand distanced out into Periods, for the easier Reading thereof.

Numbers to be read or written, viz.

96, *Ninety six*

242, *Two hundred forty two*

7924, *Seven thousand 9 hundred 24*

54006, *Fifty four thousand and six*

524707, *Five hundred 24 thousand 707*

4706240, *Four millions 706 thousand 240*

62700472, *Sixty two millions 700 thousand 472*

474960204, *Four hundred 74 millions 960 thousand 204*

4214007042, *Four thousand 214 millions 7 thousand 42*

4214007042, *Four hundred and 70 thousand 706 millions 420 thousand and 42.*

Of Numeral Letters.

Sometimes Numbers are expressed by Letters; and it is necessary to understand them, for the readier Reading the Dates of Years, frequently used at the Foot of Title Pages of Books, and on Funeral Monuments, and in Roman History, &c.

I signifies One

V Five

X Ten

L Fifty

C an Hundred

CC Two hundred

D or 13 Five hundred

M or CI A Thousand

133 Five Thousand

CC133 Ten Thousand

1333 Fifty Thousand

CCCC1333 A hundred Thousand

E 3.

133333 Five hundred Thousand

CCCCC133333 Ten hundred thousand, or a Million

M DCC XXXII expresses this present Date of 1732; M being One Thousand; D Five hundred, CC Two hundred, and XXXII Thirty two; together, One thousand seven hundr. thirty two.

Addition.

IS the putting together Two or more Numbers or Sums, so as their total Value may be discovered or known.

Herein we must always observe to set the Numbers to be added, orderly one under the other; that is, Units under Units, Tens under Tens, Hundreds under Hundreds, &c. as in the subsequent Examples.

Addition of Numbers of one Denomination.

<i>Yards</i>	<i>Gallons</i>	<i>Pounds</i>
H. T. U.	H. T. U.	X ^{of} Th. H. T. U.
2 4	7 5 6	5 7 9 6 2
4 2	4 3 2	3 9 7 4 4
6 8	5 7 8	6 7 2 2 2
8 6	6 9 6	7 9 6 7 4
2 4	4 2 2	2 4 9 2
4 2	6 7 8	3 9 0
2 6 6	3 5 6 2	2 4 7 4 8 4

In Addition of simple Numbers, whether it be *Yards*, *Gallons*, *Pounds*, or any thing else, remember to carry 1 for every 10 that you find in the first Row or Rank of Figures, being Units to the next Row of Tens; and the like from the Rank of Tens to the Row of Hundreds, &c. and whatever it makes in the last, you must set it down, amount to what it will.

The Numbers above are set down in Order, as before directed; that is, Units under Units, Tens under Tens, &c. as may be plainly understood, by being indicated at the Head of each Row or Rank with
Units,

Units, Tens, Hundreds, &c. Then in Casting up each Example, to know its Total, I begin at the Right-hand, or Unit's Rank, of the first Example, and say, 2 and 4 is 6, and 6 is 12, and 8 is 20, and 2 is 22, and 4 is 26; in which Row there are two Tens and 6 over; wherefore I set down 6 just under its own Rank, and carry 2 to the next or last Row, and say; 2 that I carry and 4 make 6, and 2 is 8, and 8 is 16, and 6 is 22, and 4 is 26, and 2 is 28; and it being the last Row, I set down the amount, viz. 28; so that the Total Number of Yards is found to be (by this Method) at the Bottom 286. And the next, or second Example, is found by the same Method to be 3562 Gallons. And in the Thrd and last Example, the Total Number of Pounds is found by the same Way to be 247484. And so the Total of any other Example of the same Kind, viz. simple Numbers of one Denomination, may be found. *Note*, That when any of the Ranks amounts to just 10, 20, 30, 40, 50, &c. then you must set down the 0, under its proper Rank, and carry either 1, 2, 3, 4, or 5, according to the Number of Tens that you find, to the next Row; and so you must always do, when it so happens, whether in the first, second, or third Row; or in any other, except the last, where what it amounts to must be set down, without any Reserve or Carriage in the Mind, because there is no other Row or Rank to carry to, as was hinted before.

And so much for *Addition of Numbers of one Denomination*, which never varies from what has been said above; serving strictly to keep to the critical, and nicely setting down in perpendicular Order your several Numbers, that units may precisely and directly stand under Units, Tens under Tens, &c. as hath fully been declared before. The next in order of Course, is *Addition of Numbers of several Denominations*; or, *Addition of Money*.

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As we in *England*, or *Great Britain*, keep our Accounts in Pounds, Shillings, and Pence, and Parts of a Penny; so you are to Note, that

4 Farthings make 1 Penny.

12 Pence 1 Shilling, and

20 Shillings 1 Pound.

And here also you are strictly to observe, and with the same punctually to mind, that Pounds be set directly under Pounds, Shillings under Shillings, Pence under Pence, and Farthings under Farthings; as in the Examples hereafter following.

But before you proceed, it will be necessary to have the following Tables by Heart, for the readier knowledge how many Shillings there are in so many Pence, and apprehending how many Pounds are contained in so many Shillings, &c.

Pence	s.	d.
20 is	1	8
30	2	6
40	3	4
50	4	2
60	5	0
70	5	10
80	6	8
90	7	6
100	8	4
110	9	2
120	10	0

s.	l.	s.
30 is	1	10
40	2	00
50	2	10
60	3	00
70	3	10
80	4	00
90	4	10
100	5	00
110	5	10
120	6	00

The Use of these Tables is this; whenever you are casting up any Example, or Sum of Money, you begin at the Right-hand (as before in Sums of one Denomination) the Place of Pence; and suppose the Rank, Row, or Denomination of Pence amounts, from the Bottom to the Top, to 56; then your Table of Pence tells

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tells you that 50 d. is 4 s. and 2 d. and over is 4 s. 8 d. If to 92 d. the Table tells you that 90 d. is 7 s. 6 d. and 2 d. over is 7 s. 8 d. And if to 81 d. the Table shews that 80 d. is 6 s. 8 d. and 1 d. more makes 9 s. 9 d. &c.

The *Shillings-Table* serves to lead you to a quick Recollection how many Pounds there are in so many Shilling; as admit the Rank of Shillings arises to 57 s. the Table says that 50 s. is 2 l. 10 s. and 7 s. over makes 2 l. 17 s. If to 84 s. the Table declares that 80 s. is just 4 l. and 4 s. over makes 4 l. 4 s. If to 112 s. the Table tells you that 100 s. is 5 l. and 12 s. more make 5 l. 12 s. &c.

Addition of Money.

Money Owing, and Money Received, as follows.

		(1)		(2)	
		l. s. d.		l. s. d.	
Ow. to	Mr Andrews	4 12 6	Rec. for	Tobacco	46 10 9
	Mr Bent	7 06 9		Sugar	79 16 0
	Mr Crawley	4 12 0		Indigo	42 18 3
	Mr Dupper	6 17 7		Broad clo.	66 12 4
	Mr Edlin	5 06 6		Canary	90 16 0
	Mr Franklin	4 12 3		Port-Wi.	84 07 6
	Mr Gregory	6 00 0		Rice	24 12 0
	Mr Fisher	5 15 4		Logwood	60 10 0
		45 02 11		496 02 10	

Note, That *l.* stands for Pounds, *s.* for Shillings, *d.* for Pence, and *qr.* for Farthings; in regard that *Libra* signifies a Pound, *Solidus* a Shilling, *Denarius* a Penny, and *Quadrans* a Farthing.

I begin with the first Example of Money Owing, and say, 4 and 3 is 7, and 6 is 13, and 7 is 20, and 9 is 29, and 6 makes 35 Pence; now 30 Pence, according

B 5

ding

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ding to the Table, is 2 s. and 6 d. and 5 d. makes 2 s. and 11 d. I set down 11 exactly under the Rank of Pence, and say, 2 Shillings that I carry (which I do to the Rank of Shillings) and 5 is 7, and 2 is 9, (for I only take the Unit Rank of Shillings) and 6 is 15, and 7 makes 22, and 2 is 24, and 6 is 30, and 2 makes 32; and now being come to the Top of the Sum, and it making 32, I come down with the Tens of Shillings, saying, 32 and 10 is 42, and 10 is 52, and 10 is 62, and 10 is 72, and 10 makes 82 Shillings; and the Table telling me that 80 Shillings is 4 Pounds, I know therefore 82 s. is 4 l. 2 s. wherefore I set down the odd 2 s. just under the Row of Shillings, and carry 4 Pounds to the Pounds; saying, 4 that I carry and 5 is 9, and 6 is 15, and 4 is 19, and 5 is 24, and 6 is 30, and 4 is 34, and 7 is 41, and 4 makes 45 Pounds; so that the Total of those several Sums of Money, due to those several Persons, amounts to 45 l. 02 s. 11 d. as in the Example.

In the second Example of Money Received, I begin at the Right-hand, (as in all *Additions*, *Subtractions*, and *Multiplications*, we do, and ought so to do, working from the Right-hand to the Left; but in *Division* you begin the Operation at the Left, and work towards the Right,) and say, 6 and 4 is 10, and 3 is 13, and 9 makes 22; and 22 Pence being 1 s. 10 d. I set down 10, and carry 1 s. to the Shillings; saying, 1 that I carry and 2 is 3, and 7 is 10, and 6 is 16, and 2 is 18, and 8 is 26, and 6 makes 32; then I come down with the Tens, saying, 32 and 10 makes 42, &c. and find at the Bottom it comes to 102 Shillings; which making 5 l. 2 s. I set down 2 s. and car. 5 l. to the Pounds; saying, 5 that I carry and 4 is 9, &c. I find that at the Top it amounts to 36, wherefore I set down 6 exactly under its own Rank, viz. the Rank of Units of Pounds, and carry 3 for the
3 Tens

3 Tens that are in 30, (for at all Times in the first Denomination of Addition, whether of Money, Weight, or Measure; that is, in the Denomination of Pounds, Tuns, or Yards, you must cast them up as Sums of one Denomination; that is, for every Ten carry One to the next, &c.) saying, 3 that I carry and 6 is 9, and 2 is 11, and 8 is 19, &c. and find that at the Top it comes to 49; wherefore I set down 49 before the 6; and the Total Account of the Money Received for those particular Goods or Wares sold, is 496 *l.* 02 *s.* 10 *d.*

More Examples for Practice.

	<i>l.</i>	<i>s.</i>	<i>d.</i>	(10)	(20)	(12)	(4)	<i>l.</i>	<i>s.</i>	<i>d.</i>
Mr Money	17	12	6 $\frac{3}{4}$	1	146	12	3 $\frac{1}{2}$	4	10	6
Mr Gaunt	26	10	2	27	8	10	9	0	07	9
Mr Hern	50	00	0	46	16	6		1	00	0
Mr James	44	12	8 $\frac{3}{4}$	100	00	0		1	01	0
Mr King	60	14	0	72	12	4		0	04	6
Mr Long	29	16	6 $\frac{3}{4}$	69	16	6 $\frac{3}{4}$		0	10	0
Mr Monk	16	10	0	460	12	6		4	14	4
Mr Napper	20	00	0	49	10	0		0	07	6
Mr Oliver	27	11	4 $\frac{1}{2}$	7	12	4 $\frac{1}{2}$		0	01	6
Mr Perkins	17	04	0	22	10	0		0	02	6
Mr Quinton	20	10	3	164	12	9		3	10	9
Mr Roper	46	16	8	75	10	6		1	10	0
Total	377	18	3	1490	16	6 $\frac{3}{4}$		18	02	4

Over the Middle Example there are Numbers set, to denote what you must stop at, if you cannot cast it up without.

Additions

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Addition of Avoirdupois Weight.

By this Weight are weighed all Kinds of Grocery Goods or Wares, or Goods subject to Waste ; as, Tobacco, Sugars, Fruit and Druggs, as also Butter, Cheese, Allom, Tallow, Flesh, Iron, Brass, Copper, Lead, Tin, or Pewter, Pitch, Tar, Rosin, Hemp, Flax, Soap, Salt, and all Kind of Garbled Goods ; that is, those Goods that have Dust, Dross, or Waste.

A Table of this Weight is as follows ; viz.

	Marked
4 Quarters make 1 Dram	dr. Drams
16 Drams 1 Ounce	oz. Ounces
16 Ounces 1 Pound	lb. Pounds
28 Pound 1 qr. of a Hundred Weight, or 112 lb.	qr. Quarters
4 Quarters 1 Hundred Wt.	C. Hundreds
20 Hundred Wt. 1 Tun.	T. Tuns

(28) (10) (4) (28)				Small Weight.			
C.	qrs.	lb.	C.	qrs.	lb.	lb.	oz. dr.
5	1	16	24	1	12	9	1 16 24 11 12
4	2	24	42	2	00	4	3 26 42 14 15
6	3	06	16	1	12	7	1 00 64 10 11
7	0	12	25	3	24	5	3 27 29 09 10
9	1	20	19	0	20	4	3 00 16 12 13
6	2	00	26	1	22	2	2 02 27 13 14
39 3 22				154 3 06			
34 3 15				206 09 12			

In the first of these Examples I begin at the Right-hand, to wit, at the Denomination of Pounds, and stop at every 28, so many Pounds making a Quarter ; that is, at every 28 I make a Speck on my Nail, (not in the Sum, for that Way is not proper or handsome) and

and I find two 28's, and 22 lb. over ; wherefore I set down 22, and carry 2 qrs. to the Quarters, and adding them up find them 11, which is 2 Hundred, and 3 qrs. over ; wherefore I set down 3, and carry 2 to the Hundreds ; which also added up, make 39 ; so that the Total Weight is 39 C. 3 qrs. and 22 lb. &c.

And, for the Example of *Small Weight*, there I stop at 16 and 16, and at 10 in the Pounds, and find the Total 206 l. 09 oz. and 11 Drams. There's no occasion for stopping but only at 28 in the Great Weight, and at 16 and 16 in the Small.

☞ *Note*, That in Weighing at the Water-side, or elsewhere, they do not weigh by the Tun in *Great Weight*, though some Goods are sold by it, as *Iron*, *Log-wood*, *Cheese*, &c. but by Hundreds, Quarters, and Pounds, and afterwards computed by Tuns, &c.

Addition of Troy Weight.

By this Weight are weighed *Yeavels*, *Gold*, *Silver*, *Pearl*, *Electuaries*, and *Liquors* ; a Pint of Water, Wine, &c. being a Pound ; and the usual Denominations are *Pounds*, *Ounces*, *Penny-weights*, and *Grains*, as in the following Table, viz.

☞ 24 Grains make 1 Penny-weight.
Note, that { 20 Penny-weight 1 Ounce, and
 { 12 Ounces 1 Pound Troy.

Note also, That 25 l. is a Quarter of a Hundred of this Weight, 100 lb. is 1 Hundred Weight, and 20 Hundred 1 Tun of Gold or Silver.

Examples

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Examples of Troy-weight.

6 Ingots of silv. wt. viz. (10)(12)(20)(24)(10)(20)(24)

No.	l.	oz.	p.w.	gr.	lb	oz.	p.w.	gr.	oz.	p.w.	gr.
1 Wt.	4	05	12	10	14	06	10	11	204	10	14
2	5	04	16	17	24	10	11	12	96	07	17
3	3	11	19	20	21	06	07	17	100	11	12
4	4	06	07	12	22	10	12	14	56	16	20
5	5	01	11	12	16	11	12	13	212	10	23
6	4	11	12	13	21	07	06	17	96	19	12

28 06 00 12--122 05 01 12--767 17 02

In the Denomination of *Grains*. I stop at 24, and find it to amount to 3 *penny-weights* and 12 *grains* over; wherefore I set down 12 *grains*, and carry 3 *penny-weights* to the *penny-weights*; then I say, 3 that I carry and 2 is 5, and 1 is 6, and 7 is 13, and 9 is 22, and 6 is 28, and 2 is 30; and then coming down with the Tens, I say, 30 and 10 is 40, and 10 is 50, &c. just as I do in *Addition of Money*; for as there 20 s. make a Pound, so here 20 *penny-weights* make an Ounce) and find it to come just to 80; now in 80 there are just 4 Twenties, or 4 Ounces; wherefore I set down 00, and carry 4 to the Ounces, and find them to amount to 42, which makes 3 Pounds, and 6 Ounces over; wherefore I set down 6, and carry 3 to the Pounds; saying, 3 I carry and 4 is 7, and 5 is 12, &c. and find they come to 28; so the Total is 28 lb. 06 oz. 00 p. w. 12 gr. and so of the rest:

How.

How to prove Addition.

IN all *Additions*, whether of simple Numbers, that is, Numbers of one Denomination; or in Examples compound, that is, of diverse Denominations, as Pounds, Shillings, Pence, and Farthings; or Tuns, Hundreds, Quarters, and Pounds, Great Weight; or Pounds, Ounces, and Drams, Small Weight; Pounds, Ounces, Penny-weights, and Grains, Troy-weight; I say, in any of the Examples above-mentioned, the truest and best Method of Proof, is to cast the same downwards (beginning at the Top) as you did the same upwards, (beginning at the Bottom) and if it proves the same Total, the Work is infallibly right, and beyond any Contradiction; and is much better and more feasible than the common Method used in Schools, of making two Totals, by omitting the upper Line in the Second, which is altogether impracticable in real Business. I might here also give the several Examples of other *Additions*, such as *Apothecaries Weight*, *Cloth*, *Liquid*, *Dry* and *Long Measures*, *Time*, &c. but the same Method serves for any of them, having respect to the several Tables of Quantity belonging to those several Denominations of Addition above-mentioned, which are as follows, viz.

A Table of the Parts of Apothecaries Weight.

	Marks
20 Grains 1 Scruple.	⊃ a Scruple
3 Scruples 1 Dram.	℥ a Dram
8 Drams 1 Ounce.	℥ an Ounce
12 Ounces 1 Pound.	℔ a Pound

By these Weights they compound their Medicines; but they buy and sell their Druggs by *Avoirdupois-Weight*.

Cloth.

Cloth-Measure.

- 4 Nails, or 9 Inches, 1 *qr.* of a Yard.
 4 *qrs.* or 36 Inches, 1 Yard.
 5 *qrs.* or 45 Inches, 1 *Ell Engliſh.*
 3 *qrs.* or 27 Inches, 1 *Ell Flemiſh.*
 6 *qrs.* or 54 Inches, 1 French *Ell.*

A Table of Wooll-weight.

Note, That 7 lb. make 1 *Clove*, 2 *Cloves* or 14 lb. 1 *Stone*, 2 *Stones* or 28 lb. 1 *Todd*, 6 *Todd* and $\frac{1}{2}$ 1 *Wey* or 182 lb. 2 *Weys* or 364 lb. 1 *Sack*, and 12 *Sacks*, 1 *Last* or 4368 lb. 240 lb. 1 *Pack of Wooll.*

Note, That 1 lb. 12 oz. 12 p. *av.* *Troy*, is equal to a Pound *Avoirdupois*. And a Pound *Troy* is about 13 oz. 2 *Drams* and a half *Avoirdupois*.

l. s. d.

A Pound of Weight *Troy* } of Silver, is worth { 3 02 2
 A Pound Wt. *Avoirdup.* }
 100l. { in Gold } weighs { 1 11 $\frac{3}{4}$ } *Avoirdup. Wt.*
 { in Silver } { 26 04 }

A Pound *Avoirdupois* is heavier than a Pound *Troy*:
 But an Ounce *Troy* is heavier than an Ounce *Avoirdupois*.

A Table of Liquid Measure.

Liquid Measure is of two Sorts, viz. one for *Wine*, *Brandy*, &c. and the other for *Beer* and *Ale*.

Wine, &c.

- 8 Pints 1 Gallon 2 Hogſheads 1 Pipe or Butt
 42 Gallons 1 Tierce 2 Pipes or Butts 1 Tun, or
 63 Gallons 1 Hogſhead 252 Gallons.
 84 Gallons 1 Puncheon

Note, That *sweet Oyl* hath 236 Gallons to the Tun:
 But *Oyl from Greenland* hath 252 Gallons to the Tun.

Note, The *Wine Gallon* contains 231 Cubick or Solid Inches, by which all Liquids are measured, except *Beer* and *Ale*.

Beer:

Beer-Measure.

- | | |
|-----------------------|-------------------------------|
| 8 Pints 1 Gallon | 2 Kilderkins 1 Barrel, or |
| 9 Gallons 1 Firkin | 36 Gallons |
| 2 Firkins 1 Kilderkin | 1 Barrel and half, or 54 Gal- |
| | lons, 1 Hogshead |

Ale-Measure.

- | | |
|----------------------------|---------------------------|
| 8 Pints 1 Gallon | 2 Kilderkins 1 Barrel, or |
| 8 Gallons 1 Firkin of Ale, | 32 Gallons |
| Soap, or Herrings | 1 Barrel and half, or 48 |
| 2 Firkins 1 Kilderkin | Gallons, 1 Hogshead. |

Note, The *Beer* and *Ale* Gallon are the same, viz. 282 solid Inches; but with this Difference, i. e. the Barrel of Beer contains 1128 Cubick Inches, or four Gallons more, than the Barrel of Ale.

In a Tun of Wine are

- 2 Pipes or Butts
- 6 Tierces
- 252 Gallons
- 504 Pottles
- 1008 Quarts
- 2016 Pints

In a Pipe or Butt are

- 2 Hogsheads
- 3 Tierces
- 126 Gallons
- 252 Pottles
- 504 Quarts
- 1008 Pints

In a Puncheon are

- 84 Gallons
- 168 Pottles
- 336 Quarts
- 672 Pints

In a Hogshead are

- 63 Gallons
- 126 Pottles
- 252 Quarts
- 504 Pints

In a Barrel of Beer are

- 2 Kilderkins
- 4 Firkins
- 36 Gallons
- 72 Pottles
- 144 Quarts
- 288 Pints

In a Barrel of Ale are

- 2 Kilderkins
- 4 Firkins
- 32 Gallons
- 64 Pottles
- 128 Quarts
- 256 Pints

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Dry-Measure.

2 Pints 1 Quart	<i>Tbames</i> ; Salt and Sea-
2 Quarts 1 Pottle	coal are heaped, or else
2 Pottles 1 Gallon	there are 5 Pecks to the
2 Gallons 1 Peck	Bushels
4 Pecks 1 Bushel Land-	<i>In a List are</i>
Measure	2 Weys
5 Pecks 1 Bushel Water-	10 Quarters
Measure	80 Bushels
4 Bushels 1 Comb, or half	320 Pecks
Quarters	1280 Pottles
2 Combs 1 Quarter	2560 Quarts
4 Quarters 1 Chaldron	5120 Pints
5 Quarters 1 Wey	<i>In a Wey are</i>
2 Weys 1 Last, or ten	5 Quarters
Quarter	40 Bushels
4 Fatts or Vatts, or 56	160 Pecks
Bushels, of Sea-coal, 1	320 Gallons
Chaldron; and 21	640 Pottles
Chaldron is accounted	1280 Quarts
a Score in the River of	2560 Pints

Note, By an Act Anno 1712, the Bushel is 2150 $\frac{1}{2}$ Cubick Inches; and a Gallon of this Measure is 272 $\frac{1}{2}$ Cubick Inches.

Long-Measure.

3 Barley Corns 1 Inch	8 Furlongs 1 Mile, or
12 Inches 1 Foot	1760 Yards
3 Feet 1 Yard	3 Miles 1 League
3 Feet 9 Inches 1 Ell Eng.	20 Leagues, or 60 Miles,
5 Feet a Geometrical Pace	1 Degree; and 360
5 Yards and half, 1 Pole,	Degrees the supposed
Perch or Rod	Circumference of the
6 Feet 1 Fathom or 2 yds.	Earth and Sea.
40 Poles, or 220 Yards,	
1 Furlong	

In a Mile are

8 Furlongs	5280 Feet
320 Poles	63360 Inches
1760 Yards	190080 Barley Corns

Land-Measure.

- 5 Yards and half, 1 Pole, Perch, or Rod.
- 40 Poles make 1 Rod, or quarter of an Acre.
- 160 Poles in Length, and 1 in Breadth, is 1 Acre.
- 80 Poles in Length, and 2 in Breadth, 1 Acre; and
- 40 Poles in Length, and 4 in Breadth, 1 Acre.
- 4 Poles in Length make 1 Chain.
- 10 Chains in Length, and 1 in Breadth, make 1 Acre.

Time.

60 Seconds 1 Minute	<i>In a Year are</i>
60 Minutes 1 Hour	
24 Hours 1 Day natural	31557600 Seconds
7 Days 1 Week	525960 Minutes
4 Weeks 1 Month	8766 Hours
13 Months, 1 Day, and 6 Hours, 1 Solar Year.	365 Days 6 Hours.

Note, The Year is also divided into twelve Calendar Months, which contain 365 Days, according to this good old Verse, viz.

*Thirty Days hath September, April, June, and November;
February hath 28 alone; and all the rest thirty and one.*

Subtraction.

THE next Rule in *Arithmetick* is *Subtraction*, (or commonly called *Substraction*;) and this Rule teaches to take a Lesser Number, or Sum, out of a Greater, and sheweth the Remainder, Rest, Excess, or Difference.

Note

Note always to place the lesser Number under the Greater, (and with the same Care and Order as in *Addition*;) so the Units may stand under Units, Tens under Tens, &c. and the Remainder under the Line is the Difference sought: And such Difference being added again to the Lesser Number, shall make the Greater Number, and is a certain Proof of the said Rule.

A General Rule.

Whatever you used to Stop in *Addition*, (whether of one Denomination, or of several) the same you must Borrow in *Subtraction*, when need requires: Remembering to pay, or carry one to the next Place towards the Left-hand. *Example*; Suppose Mr. *Andrews* owes Mr. *Baker* 323 Pounds, whereof Mr. *A.* hath pd Mr. *B.* the Sum of 146 Pounds in part; what remains due to

Mr. *Baker*? 177 *Answer*, 177 Pounds. Here the Lesser

Number 146, stands under the Greater 323; and to find the Remainder, or Sum resting due, I say, 6 from 3 I cannot; but 6 from 13. (for you must always borrow 10 of the next Figure in the same under Line, and put it to the Figure or Cypher that stands directly over the Figure you subtract) and there remains 7; then 1 that I borrow and 4 is 5 (for as I borrowed 10 (or 1) out of 4, so I must pay the said 1 or 10, (for so it really is, because of the Decuple Proportion of Increase from the Right hand to the Left) to the said Figure 4 again, as above hinted: I say, 5 from 2 I cannot, but 5 from 12, (borrowing 10 and putting it to the over Figure 2, as above directed) and there remains 7; then 1 that I borrowed and 1 is 2, from 3 the over Figure, and there rests 1, and so the Example is done; and by it is shewn that *A.* still owes *B.* 177 Pounds, as appears in the
Work;

Work ; and for Proof of its Verity, add 177 the Remainder, to 146 the Lesser of the two given Numbers, and it will make 323, being the same with the greater Number, or Sum of Money first due ; and therefore, a sure Proof of the Truth and Certainty of the Rule. And as *Subtraction* is proved by *Addition*, so may *Addition* be proved by *Subtraction* : For if the two aforesaid Numbers, viz. 323 and 146, are added, their Total is 469 ; from which if you deduct 146, the Remainder will be the Greater Number ; or if you subtract 323 from the said 469, the Remainder will be 146, the Lesser Number.

All Examples or Sums in *Subtraction* of one Denomination, are performed as above, they varying not at all : But however, once more, for the better Explanation. Admit, a great Sheep-Master hath in all 6904 Sheep, and takes out of them 2490 to dispose of at Market ; how many doth he leave behind ? To know this, set them down thus :

From	6904 the Greater Number,
Take	2490 the Lesser Number.

Answer 4414 the Remainder.

Here I say 0 from 4, and there remains 4 ; then 9 from Nothing (or 0) I cannot, but 9 from 10 (putting or making the 0 10) and there remains 1 ; then 1 that I Borrow and 4 make 5 ; and 5 from 9, and there rests 4 ; and lastly, 2 from 6, and there remains also 4 (for I borrowed none, and therefore there's no occasion of paying) ; so that he leaves behind him just 4414 ; which put to the Number he takes to Market, makes the Number he first had, viz. 6904, and shews the Deduction to be true, and the Answer right.

More

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More Examples for Practice.

	<i>l.</i>	<i>Tards</i>	<i>Gallons</i>	<i>Pounds</i>
From	4796	3700	47200	479672
Take	2929	1976	31976	97694
Remains	1867	1724	15224	381978
Proof	4796	3700	47200	479672

Any Distance of Time that is from any particular Date of a Year, may be known by Subtracting that Date from the present Date of the Year.

Example.

$\begin{array}{r} 1734 \\ 1666 \end{array}$ the Fire of London. $\begin{array}{r} 1734 \\ 1588 \end{array}$ the Spanish Invasion.

Since 68

since 146

$\begin{array}{r} 1734 \\ 1605 \end{array}$ Gun-powder Treason.

Since 129

Subtraction of diverse Denominations.

Of Money.

Suppose Mr. *Campion* owes Mr. *Darnell* 9*l.* 2*s.* 6*d.* and Mr. *C.* hath paid Mr. *D.* in part 6*l.* 16*s.* 4*d.* what remains due to Mr. *Darnell*? Answer, Due to Mr. *Darnell* 2*l.* 6*s.* 2*d.* as by this Example,

Again,

	(10)	(20)	(12)	(4)	Again, Mr. Edwards
	l.	s.	d.		sells to Mr. Francis, Spanish
Sold for	242	—16	—3	$\frac{3}{4}$	Wool to the Value of
Pd in part	174	—12	—6	$\frac{3}{2}$	242 l. 16 s. 3 d. $\frac{3}{4}$, and
					pays present Money, and
Answer	68	—03	—9	$\frac{3}{4}$	by a Note on Mr. Goodwin,
					the Sum of 174 l. 12 s.

6 d. $\frac{3}{2}$; what Money remains unpaid from Mr. Francis?
 Answer, 68 l. 03 s. 9 d. $\frac{3}{4}$.

In the first of these Examples I say, 4 d. from 6 d. and there remains 2 d. then 16 s. from 2 s. I cannot, but borrowing one Integer of the next Denomination, or 1 Pound, which is 20 s. I say 16 from 20, and there rests 4, and taking the over Number 2, and putting it to the Remainder 4, makes 6; wherefore I put down 06 in the Place of Shillings, and say, 1 that I borrow and 6 is 7; now 7 l. from 9 l. there remains 2 l. so the Money resting due to Mr. Darnell is 2 l. 6 s. 2 d., as in the Example.

In the second Example I say, 2 Farthings (or a half-penny) from 3 Farthings, and there remains 1 or $\frac{3}{4}$, which I set down in its proper Place, viz. under the Denomination of Farthings; then 6 from 3 I cannot, but 6 from 12 (as marked over the Denomination) and there remains 6, and 3 d. over it makes 9 d. which I place under the Line in its right Place, viz. of Pence; then 1 that I borrowed (that is, 1 Shilling) and 12 is 13; 13 s. from 16 s. and there rests 3, which I likewise set down under its own Rank; then 4 from 2 I cannot, but 4 from 12 (borrowing 10, as in Addition I carry 1 for every 10) and there rests 8; then 1 that I borrow and 7 makes 8; 8 from 4 I cannot, but 8 from 14, and there remains 6; so that the Sum remaining due is 68 l. 03 s. 9 d. $\frac{3}{4}$, as in the Work. And for its Proof, you must add the Remainder, 68 l. 03 s. 9 d. $\frac{3}{4}$ to the Lessor, or under Sum 174 l. 12 s. 6 d.

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6 d. $\frac{1}{2}$, and it makes 242 l. 16 s. 3 d. $\frac{1}{2}$ the Sum first due, and is a Proof of the Work's being Right. See the Example.

More Examples for Practice.

	(10)	(20)	(12)	(4)	(10)	(20)	(12)	(10)	(20)	(12)	4
	l.	s.	d.		l.	s.	d.	l.	s.	d.	
Due	174	16	6 $\frac{1}{2}$		74	10	4	2471	07	0	
Paid	97	12	4 $\frac{3}{4}$		29	12	9	1976	16	6 $\frac{1}{2}$	
Rema.	77	04	1 $\frac{1}{2}$		44	17	7	494	10	5 $\frac{1}{2}$	
Proof	174	16	6 $\frac{1}{2}$		74	10	4	2471	07	0	
	(10)	(20)	(12)		(10)	(20)	(12)	(10)	(20)	(12)	
1st due	74	00	00		274	16	6	796	00	0	
Paid	46	12	10		197	19	4	279	11	7	
Balance	27	07	02		76	17	2	516	08	5	
Proof	74	00	00		274	16	6	796	00	0	

Sometimes a Sum owing may be paid at several Times; then the several Payments must be added together, and their Total deducted from the Sum first due, as in this and the Examples following.

Owing	266 l.
Paid at Times	20 15 30 90 17 24 60
Paid in all	256 ded.
Rests due	10
Proof	266

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	l.	s.	d.		l.	s.	d.
More due	249	12	0	Received	100	10	0
Received	24	12	5	Paid to	6	10	0
at several	9	14	9	several	10	00	0
Times,	20	00	0	Persons	5	12	5
	16	16	6		20	10	0
	22	10	2		7	09	6
	13	12	6		9	08	6
	7	16	4		7	12	6

Rec. in all 115—02—9 Paid in all 67—09—0

Refts due 134—09—3 Remains in the Bag } 33—01—0

Proof 249—12—0

	(10)	(20)	(4)	(28)	(10)	(4)	(28)	(10)	(16)	(16)
	Tuns	C.	qr.	lb.	C.	qrs.	lb.	lb.	oz.	dr.
From	44	12	1	10	246	2	12	146	02	10
Take	39	14	2	06	164	3	22	97	10	12

4—17—3—04 81—2—18 48—07—14

Proof 44—12—1—10 246—2—12 146—02—10

Troy Weight.

	(10)	(12)	(20)	(24)		(10)	(20)	(24)
	lb.	oz.	p.w.	gr.		oz.	p.w.	gr.
From	462	04	10	11	1247	10	12	
Take	196	09	06	16	976	16	17	

Rema. 265—07—03—19 270—33—19

Proof 462—04—10—11 1247—10—12

And so much for *Subtraction*; which Method will serve for any Denomination whatever, having respect to the several Tables of Quantity, as before hinted in *Addition*.

Multiplication.

THE next Rule in order is *Multiplication*, and perhaps the most serviceable Rule in Business, for its quick Dispatch, of all others in *Arithmetick*; and I shall endeavour to shew, by its Nature, Quality, and Use, that it is so. And,

1. *Multiplication* is a Rule that from two Numbers given, teacheth to find out a Third which shall contain either of the Two as many times as the other containeth Units.

2. In some Cases *Multiplication* is also a compendious Working of *Addition*.

3. It serves likewise to bring Great Denominations into Small, as Pounds into Shillings, Pence, or Farthings.

4. Having the Length and Breadth of a plain Superficies, we find its Content in Square Measure.

4. By *Multiplication* we find, by having the Value of one Thing, or the Wages of one Person, how to know the Value of many Things, or the Wages of many Persons.

In *Multiplication* we are particularly to take Notice of these three Terms, viz.

The { *Multiplicand,*
 Multiplier, and
 Product.

1. The *Multiplicand* (generally the Greater of the two Numbers) is the Number to be Multiplied.

2. The *Multiplier*, (generally the Lesser of the two Numbers) is the Number to multiply with.

3. The

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3. The *Product*, or Result of the Work, being the Answer.

But before any Procedure can be made in this Rule, it is necessary to have the following Table by Heart, and that very perfectly.

The Multiplication Table.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3		9	12	15	18	21	24	27	30	33	36
4			16	20	24	28	32	36	40	44	48
5				25	30	35	40	45	50	55	60
6					36	42	48	54	60	66	72
7						49	56	63	70	77	84
8							64	72	80	88	96
9								81	90	99	108
10									100	110	120
11										121	132
12											144

This Table is so plain and easy, that there is no need of Direction; for 'tis but guiding the Eye from the Side Column to the Head, and in its opposite Angle or Square

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Square you have the Answer; and contrarywise by directing the Eye from the Head to the Side, you have the same; as 6 times 9 is 54, and 9 times 6 is 54; so 7 times 8 is 56, and 8 times 7 is 56, &c. And so it ought to be got by Heart for the more dextrous Readiness in Multiplying.

Now for Application.

Example 1. How many is 3 times 472? 472
 which must be set down as in the Margin; 3
 and then say, 3 times 2 is 6, which place _____
 under 3 the Multiplier; then 3 times 7 is 1416
 21; set down 1 under 7, and carry 2 for _____
 the two Tens, as in Addition of one Denomination;
 then 3 times 4 is 12, and 2 is 14; which set down,
 and the Product is 1416, that is, 3 times 472 makes
 so much; and may be proved by *Addition*, by setting
 down 472 three times, in Additional Order, and
 casting it up, which makes the Assertion good in the
 second Definition that this Rule compendiously per-
 forms the Office of Addition. Likewise the forego-
 ing Example agrees with the first Definition; for as
 3 times 472 makes 1416, so doth 472 times 3 make
 the same, viz. 1416.

Example 2. Again, How many makes 742 multi-
 ply'd by 4?

742 <i>Multiplicand</i>	}	Here I say 4 times 2 is 8, and 4
4 <i>Multiplier</i>		times 4 is 16; 6, and carry 1;
_____		and 4 times 7 is 28, and 1 is 29,
2968 <i>Product</i>		which set down; so the whole
_____		Product is 2968, as per Example.

More Examples of one Figure in the *Multiplier*, are
 these, viz.

<i>Multiplic.</i>	7420	4444	7460	90704	56789
<i>Multiplier</i>	5	6	7	8	9
<i>Product</i>	37100	26664	52220	725632	511101

Compound Multiplication.

Is when the *Multiplier* consists of two, three, four or more Figures, or Figures and Cyphers.

And here you must begin with that Figure which is in the Place of Units of the *Multiplier*, and go through the whole *Multiplicand*, by Multiplying each Figure of it first by that said Unit Figure; then by the next, to wit, by the Figure in the Place of Tens of the *Multiplier*, then with the Third, &c. to the last; always remembring to place the first Figure of every Product or Line, (for you will ever have as many as you have significant Figures in the *Multiplier*) I say remember to place the first Figure of each Line exactly and perpendicularly under the Figure you multiply by; and then add the several Lines or Products together, which so collected gives the total Product required; as in the Examples following, viz.

Example 1.

How many is, or are, 23 times 7426 ?	7426
first I begin with the Unit Figure 3 in the	23
<i>Multiplier</i> , saying, 3 times 6 is 18; 8 (which	
I set directly under 3 by which I multiply)	22278
and carry one; then 3 times 2 is 6, and 1	14852
is 7; then 3 times 4 is 12; 2 and carry 1;	
then 3 times 7 is 21, and 1 is 22: And so	170798
I have done with the first Figure of the	
<i>Multiplier</i> , viz. 3. Then I go to the next, that is 2,	
and twice 6 is 12; 2 and carry 1, (which 2 is placed	
in a direct Line under 2 the Multiplying Figure) then	
twice 2 is 4, and 1 is 5; then twice 4 is 8; and last-	
ly, twice 7 is 14, which I set down: Then I add the	
two Products together, saying, 8 is 8, &c. and the	
Total is the right and proper Product, or Result of the	
Multiplication, viz. 170798. Again,	

Example 2.

What is the Result or Total Product of 527527
Multiplied by 285

It will appear too prolix, and altogether unnecessary, to give more verbal Directions; nay, indeed nauseous Tautology, since those given above are sufficient; and therefore the Learner is referred to the Observation of the Example, as also to those two that follow, viz.

527535	275827
15728	29725
4220280	1379135
1055070	541654
3692745	1930789
2637675	2482443
527535	275827
8297070480	5440687575

When Cyphers are intermixt with Figures in the *Multiplier*, then multiply by the Figures as above; and when you come to a Cypher in the *Multiplier*, then set down another Cypher exactly and perpendicularly under it, then begin the *Multiplicand* again with the next Figure to the Cypher in the *Multiplier*, and go thro' it in the same Line, placing the first Figure of that Product next to the Cypher towards the Left-hand, but then heed must be taken that the next Figure or Cypher of the next Line must be set down one Degree farther towards the Left-hand, and not immediately under the last Figure set down next to the Cypher: As in the following Examples may be fully understood.

24393

24393 402	7864371 23604	327586 6030
48786	31457484	9827580
975720	471862260	19655160
9805986	23593113	1975343580
	15728742	
	185630613084	

When you have a Cypher or Cyphers in the *Multi-plier*, at the Beginning towards the Right-hand, then set it, or them, backwards from the Place of Units towards the Right-hand; and when you have multiply'd by the Figure or Figures, annex the Cypher or Cyphers: *As in these Examples.*

4762 70	47962 400	4632 2600
333340	19184800	27792 9264 12043200

If you have Cyphers both in the *Multiplicand* and *Multiplier*, then neglect the Cyphers in both, and multiply by the Figures, and annex the Cyphers at last: *As in these Examples.*

42600 220	42300 12000	376400 2400
842 852	846 423	15056 7528 903360000
9372000	507600000	
	F 4	When

When you are to multiply by 10, 100, 1000, or 10000, 'tis only adding or annexing so many Cyphers to the *Multiplicand*, that is, either 1, 2, 3 or 4 Cyphers, and the Work is done. *Example*, Suppose I am to multiply 375 by the Numbers above; if I multiply it by 10, then I join 0 to 375, and then it makes, or the Product is, 3750: If by 100, then I annex 00, and then it makes 37500: If by 1000, I put to it 000, and then it produces 375000: And lastly, if by 10000, I then add 0000, and then it makes 3750000, &c. And thus may any Number be multiplied, when the *Multiplier* consists of a Unit with any Number of Cyphers, and done by Inspection only, without any formal setting down the *Multiplicand* with a Line drawn under it, &c.

Thus far for Direction in the Manner how to Multiply; the next will be to shew the Uses of *Multiplication* in real Business, and how to apply it on proper Occasions, &c.

1. Suppose you want to know how many half Crowns there are in 246 l.; you know that 8 half Crowns make 1 l. wherefore set them down thus:

246 l.
multiply by 8

Answer 1968

Again, In 1968 Half Crowns, how many Pence?
30 Pence in half a Crown.

59040 Pence the Answer.

And this serves to make out, that Great Denominations are brought into Smaller by this Rule, according to the Third Definition.

2. Admit

2. Admit you wanted to know the Contents of a large Shuffle-board Table 34 Foot long and 4 Foot wide, multiply 34 the Length by 4 the Breadth, and the Answer will be — 136 square Foot for the

true Contents of such a Table. And this agrees with the 4th Definition of this Rule.

3. If I know the Value of a Yard of Broadcloth to be 12 Shillings, what is the Value of 220 yds of the said Cloth in Shillings? Multiply by 12.

44
22

Answer 2640 Shillings.

or 132 Pounds

If the Wages of 1 Seaman be 23 shillings a Month, what is the Wages of 250 Seamen for the same Time? Multiply by 23

750
50

Answer 5750 Shillings or 287 l. 10 s.

And these two Examples accord with the 5th Definition or use of this Rule.

And thus much for plain *Multiplication*.

I shall in the next Place, say some small Matter concerning *Multiplication of Money*, and a little of its Use, and so conclude this Rule.

Multiplication of Money.

Multiplication of Money (what most would learn above any Thing) hath great Affinity with *Addition of Money*; the same Method being taken in carrying from

one Denomination to the next, viz. from Farthings to Pence, from Pence to Shillings, and from Shillings to Pounds. And as in *Addition*, (and other *Multiplications*) you begin at the Right-hand, and proceed towards the Left; so here you begin at the least Denomination, which is also at the Right-hand.

This Method of Accompting is the most apt and expeditious of all others, for small Quantities; and therefore extremely necessary in making Bills of Parcels, &c. And is beyond all Contradiction, as sure and certain as any way whatsoever.

The General Rule,

Is always to Multiply the Price by the Quantity.

The first Step is, for Quantities from 2 to 12; and this is done by one Multiplier; as in the Examples following.

	l.	s.	d.
Multiply _____	7	12	6
(or 6 pcs of Cloth at l. 7-12-6 per Piece By _____)			6

			45—15—0

Here I say 6 times 6 is 36 Pence, which is just 3 s. I set down 0 in the Place of Pence, and carry 3 s. to the Place of Shillings, (exactly the same as in *Addition of Money*;) then 6 times 12 is 72, and 3 is 75 s. or 3 l. 15 s. wherefore I set down 15 in the Place of Shillings, and carry 3 to the Pounds; then 6 times 7 is 42, and 3 is 45 l. So the whole Amount of the 6 Cloths, at l. 7-12-6 per Cloth, is 45 l. 15 s. as in the Work, and very concise.

Example 2.

Again, How much is 9 times 13 s. 4 d. or what is the Amount of 9 Marks?

In this Example I say, 9 times 4 is 36 d. or 3 s. I set

_____	9
6—00—0	Answer.
_____	down

down 0, and carry 3; then 9 times 3 is 27, and 3 makes 30; I set down 00, and carry 3 (as in Multiplication of simple Numbers; then 9 times 1 is 9, and 3 is 12; which being the Tens of Shillings, consequently they are Angels; which being halved, make just 6 l. and so much is the Value of 9 Marks, or any thing else at that Price, viz. 13 s. 4 d.

Example 3.

Once more; What comes 12 Gallons of Wine to, at 5 s. 4 d. per Gallon?

Here I say 12 times 4 is 48; 0 and carry 4; then 12 times 5 is 60, and 4 is 64 s. or 3 l. 4 s. &c.

$$\begin{array}{r} \text{s. d.} \\ 5-4 \\ 12 \\ \hline \text{l. } 3-4-0 \end{array}$$

The next Degree or Step of Advance in this Way of Reckoning, is of Quantities exceeding 12, even to 12 times 12, or 144; all which, as far as 144, are found in that excellent Table, the *Table of Multiplication*; which is a ready Help to all Purposes of Reckoning, and particularly in this Way: And that you may proceed with Dexterity, you must be very ready in the said Table, that you may be immediately apprehensive what component Parts hit your Quantity proposed, or pretty near it; (for any Quantity below 12 needs no Recollection at all, as in two of the Examples foregoing;) and then Work accordingly; as 15 Yards at, &c. I readily know that 3 and 5, or 5 and 3, are to be my Multipliers. If to 21, then 3 and 7, or 7 and 3, as above. If to 30, then 5 and 6, or 6 and 5; also 3 and 10, or 10 and 3. If to 45, 48, 56, 66, 72, 96, &c. then 5 and 9, 6 and 8, 7 and 8, 6 and 11, 6 and 12, and 8 and 12, &c. are to be Multipliers, and exactly hit their several Quantities of which they are component Parts; and Examples of this Kind have two Multiplications for their Solution.

When

When the Quantity proposed is a Number Irregular, or such a Number that no two Numbers in the Table can be found to answer it, then we must multiply by two such Numbers as come pretty near it, as is said above; and for the Number wanting to make up the Number or Quantity proposed, multiply the given Price of one by the Number that is wanting, which will make three Products by three Multiplications; which last Product must be added to the foregoing Products resulting from two Multiplications, and the Total will be the Answer.

And first, I shall shew Examples of the second Step, viz. of Regular Quantities that exceed 12, and are precisely answered at two Multiplications, such as mentioned above, viz.

What comes 15 Yards of Muslin to, at 3—5
per Yard? s. d.
3 & 5

Here 3 times 5 is 15 d. or 1 s. 3 d. _____
3 and carry 1 s; then 3 times 3 is 9, 10—3
and 1 is 10 s. so the first Product is 5
10 s. 3 d. which I multiply by 5, say- _____
ing, 5 times 3 is 15 d. or 1 s. 3 d. 2—11—3
3 and carry 1; then 5 times 10 _____
is 50, and 1 is 51 s. or 2 l. 11 s. So the whole
Amount of 15 Yards, at 3 s. 5 d. per Yard, is 2 l. 11 s.
3 d. And demonstrable thus, viz. If 10 s. 3 d. be the
Value of three times 3 s. 5 d. then 5 times the Value of
10 s. 3 d. must of necessity be 15 times the Value of
3 s. 3 d. because 5 times 3 is 15: And its Truth may
be proved by *Addition* and *Multiplication*, thus; set
down 3 s. 5 d. three times, in Additional Order, and
put the three Lines together, and the Total of them
multiply by 5, as before, and the Answer will be the
same. Or set down 17 s. 1 d. (the Product of 3 s. 5 d.
multiplied by 5) three times also, and add them to-
gether, and the Total will be exactly the same with the
Result.

Result by Multiplication; as in the following Specimen of Work.

(1)	(2)	
s. d.	s. d.	s. d.
3—5	3—5	17—1
3—5	5	17—1
3—5	_____	17—1
_____	17—1	_____
10—3	_____	2—11—3
5		

2—11—3		

Here the first of these two Proofs is worked by *Addition* and *Multiplication*, and the second by *Multiplication* (as per Margin) and *Addition*. Also,

By this we see, that in all Examples under this Head, we are to pitch on two Numbers (for *Multipliers*) in the Table; which multiplied together, make the Quantity proposed; and then we are to multiply the Price by one of the Numbers, (it matters not by which first) and then that Product is to be multiplied by the other Number, and the second or last Product will be the Answer.

Example 2.

Again, What is the Value of 21 Gallons of Brandy?

s. d.
at 7—9 per Gallon.
7 and 3

2—14—3
3

8—02—9

In this Example I say, 7 times 9 is 63 d. or 5 s. 3 d. I set down 3 and carry 5; then 7 times 7 is 49, and 5 is 54 s. or 2 l. 14 s. So the first Product is 2 l. 14 s. 3 d. which I multiply by 3, and that produces the last Product or Answer, viz. 8 l. 2 s. 9 d.

Now

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Now follow a few more Examples of this Sort, without any verbal Directions, because I think those already given to be sufficient.

Example 3.

What comes 30 Ells of
Holland to, s. d.
at 3—7 per Ell
10 and 3

1—15—10
3

Answer 5—07—06

Example 5.

56 Bushels of Wheat,
s. d.
at 4—9
7 & 8

1—13—3
8

Answer 13—06—0

Example 6.

45 Pound of Raw Silk 72 Broad Pcs, at 23—6 each
s. d. 12 & 6
at 15—6 per lb.
5 & 9

3—17—6
9

Answer 34—17—6

14—02—0
6

84—12—0

In the first Product the half
of 28 Angels is 14 l. &c.

Example 7.

108 lb. of Indigo Lahore,
at 7 s. 8 d.

19 & 12

3—9—0

12

Answer 41—8—0

In the first Product of
this Example I say, the
half of 7 is 3 and half,
or 3 l. 10 s. And in the
last, the half of 15 is 7
and half, or 7 l. 10 s.

&c.

Example 8. l. s. d.
96 C. of Currants, at ——— 2 — 13 — 5 per C.
8 and 12.

21 — 08 — 0

12

Answer 256 — 16 — 0

The next Gradation of Advance is of Quantities irregular, or of Numbers that are not to be answered precisely at two *Multiplications*: In this Case, there ariseth no Increase of Difficulty, but it is as easy as the Examples foregoing; only here you will have an Addition of one Line more, occasioned by bringing down the Price of one to be added to the last Product; or else a Line more made by multiplying the Price by what is defective or wanting in the Number by two Multiplications, to make up the proposed Quantity compleat; as it may be of 2, 3, 4, 5, &c. as by the subsequent Examples may be seen, and understood.

Example 1. What is the Product of 2 l. 13 s. 6 d. multiplied by 39?

l. 2 — 13 — 6

6 and 6

—————

16 — 01 — 0

6

—————

96 — 06 — 0

8 — 00 — 6

—————

104 — 06 — 0

—————

Here I find that 6 multiplied by 6, makes 36; which is within 3 of the Quantity proposed; wherefore I multiply by 6, and that Product again by the other 6; the last Product is 96 l. 06 s. which is the Value of 36; but we want to know the Value of 39; wherefore I multiply

multiply the Price of one, viz. 2 *l.* 13 *s.* 6 *d.* by 3 that is defective or wanting to make up 36 to 39, saying, 3 times 6 is 18 *d.* &c. And find that 3 times 2 *l.* 13 *s.* 6 *d.* is 8 *l.* 00 *s.* 6 *d.* which added to 96 *l.* 6 *s.* 0 *d.* the Total gives the compleat Value of 39; for 36 and 3 makes 39. See the Work.

Example 2. What comes 79 C. wt of Cheese to, at 28 *s.* per C. weight?

$$\begin{array}{r}
 \text{l.} \quad \text{s.} \quad \text{d.} \\
 28-0 \\
 \text{7 and 11} \\
 \hline
 9-16-0 \\
 \text{11} \\
 \hline
 107-16-0 \\
 2-16-0 \\
 \hline
 110-12-0 \text{ Answer.}
 \end{array}$$

In this Example I say, 7 times 0 is 0; then 7 times 8 is 56; 6 and carry 5; and 7 times 2 is 14, and 5 is 19; the half of which is 9 and half, or 9 *l.* 10 *s.* 0 *d.* So the first Product is 9 *l.* 16 *s.* 0 *d.* which multiplied by 11, produces 107 *l.* 16 *s.* 0 *d.* or the Value of 77; then for 2 wanting, I multiply the Price by it, and

that gives 2 *l.* 16 *s.* 0 *d.* which added to 107 *l.* 16 *s.* 0 *d.* makes the whole Value of 79, viz. 110 *l.* 12 *s.* 0 *d.* as in the Work. Or, as there are no Pence in the Price, you may multiply 28 *s.* by 79 without bringing it into Pounds as you work it, but omit it till the last, and then cut off or separate the last Figure or Cypher of the Product towards the Right-hand; and halve those towards the Left, which half will be Pounds, and the Figure cut off Shillings, as in this Example.

$$\begin{array}{r}
 28 \\
 79 \\
 \hline
 252 \\
 196 \\
 \hline
 2212 \\
 \hline
 \text{l. } 110, 12
 \end{array}$$

The

The half of 2 is 1, and the half of 2 is 1, and the half of 1 is 0, which 1 joined to the 2 severed from 221, makes 12; so the Answer is 110 *l.* 12 *s.* as before.

Example 3. 112 Pound of Sugar at 5 *d.* $\frac{1}{2}$ per *lb.* set down thus:

s.	d.	
		5 $\frac{1}{2}$ per Pound.
		10 and 10
4	07	
	10	
2	05	10
	05	06
the Product of 5 <i>d.</i> $\frac{1}{2}$ by 12 Defective.		
2	11	04
the Answer.		

Here after I have multiplied by 10 and 10, the Parts of 100, there wants 12; wherefore I multiplied 5 *d.* $\frac{1}{2}$ by 12, and it gives 5 *s.* 6 *d.* for 12 *lb.* at 5 *d.* $\frac{1}{2}$, which added to *l.* 2-5-10 the Value of 100, makes *l.* 2-11-4 the true Value of 112 *lb.* at 5 *d.* $\frac{1}{2}$ per Pound.

Example 4. 94 Stone of Beef, at 22 *d.* or 1 *s.* 10 *d.* per Stone.

1	s.	10	d.	
				10 and 9
18		04		
		9		
8	05	00		
	7	04		
8	12	04		Answer.

Here what is wanting, after the two Multiplications, is 4; wherefore I multiply 1 *s.* 10 *d.* (the Price) by 4, which produces 7 *s.* 4 *d.* to be added, &c.

Example

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Ex. 5. 97 C. $\frac{1}{2}$ of Raisins,

at $\begin{matrix} s. & d. \\ 25 & -06 \end{matrix}$ per C.
9 and 10

11-09-06
10

114-15-00
8-18-06

12-09 for the $\frac{1}{2}$ C.

124-06-03

After I have multiplied by 9 and 10, I multiply the Price, 25 s. 6 d. by the Quantity wanting, and it produces *l.* 8-18-6 : then for the half C. I take half of the Price, which is 12 s. 9 d. and then collect the three Lines, the Total of which is *l.* 124-6-3 for the Answer.

Note, From the last Example may be observed, That there is no need of too much solicitude concerning coming so very near By two Multiplications, for there 7 is wanting to make up the true Quantity ; nay, if the two Multiplications be short by 10 or 12, it is near enough ; for 'tis as easy to multiply the Price by 10 or 12 as by 2 or 3, and the Addition is the same.

Example 6. Once more ; What comes 100 C. $\frac{3}{4}$ of Hops to, at *l.* 4-10-6 per C. ?

l. 4-10-06
10 and 10

45-05-00
10

452-10-00
45-05-00

2-05-03
1-02-07 $\frac{1}{2}$

501-02-10 $\frac{1}{2}$ Answer

After I have multiplied by 10 and 10, which makes 100 ; I multiply the Price, *l.* 4-10-6 by 10 that is wanting, which gives the same with the first Product, viz. *l.* 45-5-0, which stands under the Product by 100 ; and for the $\frac{3}{4}$ of a C. I take $\frac{3}{4}$ of the Price, viz. first the half, and then the half of that half, that is, *l.* 2-5-3 and

and $l. 1-2-7\frac{1}{2}$; which four Lines added together, make $l. 501-02-10\frac{1}{2}$ for the Answer.

To prove Multiplication,

WHether of Simple Numbers, or of Money; it is most surely done by *Division*; but before that is known, take this Method, *viz.* As you multiplied the *Multiplicand* by the *Multiplier*, so contrarywise multiply the *Multiplier* by the *Multiplicand*; and if the Products are alike, the Work is right; otherwise one of them is wrong, and must be gone over again till they do agree.

Example 1.

365 Days in a Year.

24 Hours in a Day.

1460

730

8760

Here (Reversely) I say, 5 times 4 is 20; 0 and carry 2; 6 times 4 is 24, and 2 is 26; 6 and carry 2; and 3 times 4 is 12, and 2 is 14. Then 5 times 2 is 10; 0 and carry 1; 6 times 2 is 12, and 1 is 13; 3 and carry 1; and 3 times 2 is 6, and 1 is 7: Which Products added together, make 8760, the Hours in a Year, without taking in the odd 6 Hours, which the Year doth consist of more than 365 Days.

Example

Example 2.

56 Gallons of Spirits, at	I say here, twice 7 is
<i>s. d.</i>	14; 2 and carry 1 <i>s.</i> and
3—2 per Gallon.	3 times 7 is 21, and 1 is
7 and 8	22 <i>s.</i> or 1 <i>l.</i> 2 <i>s.</i> Again,
— — — — —	twice 8 is 16 <i>d.</i> 4 and
1—02—2	carry 1 <i>s.</i> and twice 8 is
— — — — —	16, and 1 is 17 <i>s.</i> 17 and
8—17—4 Answer:	carry 0; and once 8 is
— — — — —	8 <i>l.</i> Thus both these Ex-

amples are the same in consequence as if you proceeded in the common and regular Method of *Multiplication*, and shews the Truth of Operation.

The next Rule in order, of Course, is,

DIVISION.

THIS Rule, though accounted the hardest Lesson in *Arithmetick*, yet I shall make it easy and intelligible to the meanest Capacity.

The Use of this Rule is to know how many Times one Number or Sum is contained in another; as if it were asked how often is 9 contained in 54? the Answer is 6 times; or, how many times 12 is there in 144? Answer, 12 times.

As by *Multiplication* great Names or Denominations are brought into Small; so contrarily, by *Division*, small Names are brought into Greater; as Farthings (from one Gradation to another) into Pounds, Pounds Weight into Tuns Weight, and Gallons Liquid into Tuns Liquid, &c.

In this Rule we are to take particular Notice of these Three certain Terms following, *viz.*

1. The

1. } *Dividend*, or Number to be divided.
2. } The { *Divisor*, or Number by which we divide.
3. } { *Quotient*, or Answer to the Work ; which shews how often the *Divisor* is contained in the *Dividend*.

4. The *Remainder* ; which is an uncertain Branch of this Rule, because there is sometimes a Remainder, and sometimes not. ☞ And you must particularly Note, That the *Remainder* is ever of the same Name with the *Dividend*, and is always less than the *Divisor* ; for if it be more, or equal to the *Divisor*, the Work is wrong.

Division is either Single or Compound ; *Single*, when the *Divisor* consisteth of a single Figure, and the *Dividend* of two at most : Any thing of this Sort is answered by the *Multiplication-Table* ; as if 63 were to be divided by 7, the Answer will be 9 times. Here 63 is the *Dividend*, 7 the *Divisor*, and 9 the *Quotient* or *Answer*.

Compound Division is when the *Dividend* hath many, or more Figures or Cyphers than Two, and the *Divisor* one or more Figures or Cyphers, &c.

Example.

How many times 7 is there contained in 365 ? Or, how many Weeks in a Year ?

$$7 \overline{) 365} \quad (52$$

A General Rule for Working.

- Note, { 1. Seek,
2. Multiply,
3. Subtract.

$$\begin{array}{r} 35 \\ 15 \\ 14 \\ \hline (1) \end{array}$$

Having set down the Example with two crooked Lines, or half Parenthesis, one for the *Divisor*, and the other for the *Quotient*, I begin according to the afore-mentioned general Rule for Working, by seeking or

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or asking how often I can take 7 the *Divisor*, out of 36 the two first Figures of the *Dividend* (for I cannot take 7 out of 3, the *Quotient* being never to begin with 0) and the *Answer* is 5 times; wherefore I place 5 in the *Quotient*, and multiply the *Divisor* 7 by it (as directed in the *General Rule*) saying, 5 times 7 is 35, which I place under 36; and then Thirdly, according to the said Rule, I subtract 35 from 36, and there remains 1; to which I bring down the next, or last Figure of the *Dividend*, viz. 5, and then there is 15 for a New *Dividend*, or *Dividual*, to work upon: then I ask or seek again, how oft 7 may be taken in 15? and the *Answer* is 2 times; wherefore I put 2 in the *Quotient* next to the 5; by which 2 I also multiply the *Divisor* 7, saying, twice 7 is 14; which I set down under 15, and subtract, and there remains 1, which I place between two Semi-Circles thus, (1) as it stands in the Work; where observe, That 365 is the *Dividend*, 7 the *Divisor*, 52 the *Quotient* or *Answer*, and 1 the *Remainder*: The *Quotient* declares, that 7 is contained, in 365, 52 times, and 1 over, or remaining; which I set over the *Divisor* thus, $\frac{1}{7}$, and signifies that there is one seventh of a Week, or 1 Day, more than just 52 Weeks in a Year, or 365 Days; which is easily to be found by collecting the Days of each Calendar Month as they stand in the Almanack.

You may Note, That the said $\frac{1}{7}$ one seventh, is properly what is called a *Fraction*, or a Piece or Segment of the *Dividend*; but of this hereafter.

Note also, That if there had been more Figures or Cyphers in the *Dividend*, they must have all been brought down, one by one at a time, (and never but one at a time) and (after *Subtraction*) set to the *Remainder*; and if there remains 0, you must still bring down but one Figure or Cypher at a time; and for every Figure or 0 so brought down, there must be a
Figure

Figure or 0 placed in the *Quotient*, according to the times you can take the *Divisor* out of the several *Dividends* you make, by drawing down a Figure or Cypher at a time out of the *Dividend*, till all be brought down, and the Work ended.

For a Specimen, let us Divide 8060 Pounds of Tobacco equally among 8 Men.

8) 8060 (1007 *Quotient*.

$$\begin{array}{r} 8 \dots \\ \hline 60 \\ 56 \\ \hline \end{array}$$

(4)

Here I say the Eights in 8 once; which I put in the *Quotient*; then the Eights in 0, 0 times; which I likewise put in the *Quotient*; then the Eights in 6, 0 times again; which is also placed in the *Quotient*, and there remains 6; to which I bring down 0, the last of the *Dividend*, and it makes 60; lastly, the Eights in 60 7 times, and 7 times 8 is 56 from 60, and there remains 4; so the *Quotient* shews that each Person must have 1007 Pounds of Tobacco for his Share in the *Dividend* 8060, and there remains 4 Pounds over and above, which makes half a Pound more due to each Man, because 4 the Remainder is half of 8 the *Divisor*: And so the Work is done, the *Quotient* giving to each Man 1007 Pounds and half for his equal share.

Note, That in the Operation, every time that you bring down a Figure or Cypher, you are to make a Point under it in the *Dividend*, to signify that such a Figure or Cypher hath been brought down and done with, as may be observed in the foregoing Example.

Though this Way of Working is plain, and easy to be understood, yet it is somewhat tedious; and therefore I shew a quicker Way for dispatch, when the *Divisor* is a single Figure; as shall be made conspicuous in these Examples following, viz.

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	(1)	(2)	(3)
	4) 78906	5) 34567	6) 29702
Quotient	19726 (2) 4	6913 (2) 5	4950 (2) 6
Proof	78906	34567	29702

In the first of these Examples I say, the 4's in 7 once, and there remains 3; which makes 8, the next Figure in the Dividend, 38; then the 4's in 38 9 times; 9 times 4 is 36, from 38, and there remains 2; which makes 9, the next Figure of the Dividend, 29; then the 4's in 29, 7 times; 7 times 4 is 28 from 29, and there rests 1; which makes 0, the next of the Dividend, 10; and the 4's in 10, twice; twice 4 is 8 from 10, and there remains 2; which makes 6, the last of the Dividend, 26; lastly, the 4's in 26 6 times; and 6 times 4 is 24, from 26, and there rests 2 the Remainder: And so for the other two Examples. And for Proof of the Work, (or of any other Example) multiply the Quotient by the Divisor, and take in the Remainder in the first place, or place of Units; and if the Product be the same with the Dividend, the Division is right: For I say, 4 times 6 is 24, and 2 the Remainder makes 26; 6 and 0 2, &c.

More Examples by a single Figure.

	3) 54321	7) 279060	9) 234567
Quotient	18107 (0) 3	39865 (5) 7	26063 (0) 9
Proof	54321	279060	234567

This

This is the shortest Way of Division that can be by a single Figure.

As it is necessary for Expedition to multiply by 11 and 12, as by a single Figure to have the Product in one Line; so divide as in these Examples, viz.

	11) 72646206	12) 76677240
Quotient	6604200 (6) 11	6389770 12
Proof	72646206	76677240
	11) 47627000	12) 42007400
Quotient	4329727 (3) 11	3500616 (8) 12
Proof	47627000	42007400

In the first of these Examples, I say, the 11's in 72, answer 6 times, &c. In the second I say, the 12's in 76, answer 6 times, &c. In the third, the 11's in 47, 4 times; 4 times 11 is 44, from 47, and there rests 3, &c. In the fourth, I say, the 12's in 42, 3 times; 3 times 12 is 36, from 42, and there remains 6, &c.

By being ready and dextrous in the Examples above, you may expeditiously Divide by these Numbers, viz. 110, 120, 1100, or 1200, &c. for 'tis but cutting off, or separating the Cyphers from 11 and 12, (when these Numbers happen to be Divisors) and cutting off or separating the like Number of Figures or Cyphers from the Right-hand of the Dividend, and then divide the other Figures or Cyphers towards the Left-hand,

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by 11 or 12, as it shall happen; as in the Examples following, viz.

Divide 34567 by 110, and 890123 by 120, and 98765 by 1100, and 678901 by 1200.

$\begin{array}{r} 11,0 \overline{) 3456,7} \\ \text{Quotient} \quad 314 \frac{2}{11} \text{ or } \frac{27}{110} \end{array}$	$\begin{array}{r} 12 \overline{) 89012,3} \\ 7417 \frac{8}{12} \text{ or } \frac{28}{120} \end{array}$
$\begin{array}{r} 11,00 \overline{) 987,65} \\ \text{Quotient} \quad 89 \frac{8}{11} \text{ or } \frac{865}{1100} \end{array}$	$\begin{array}{r} 12 \overline{) 678901} \\ 565 \frac{9}{12} \text{ or } \frac{901}{1200} \end{array}$

Whenever you divide by 10, 100, 1000, or 10000, &c. you have nothing more to do than to cut off, or to separate so many Figures or Cyphers of the Dividend towards the Right-hand, as you have Cyphers in the Divisor, and those Figures towards the Left make your Quotient; and those you cut off towards the Right, is the Remainder.

Examples.

Divide 123456789 by 10, 100, 1000, and 10000.

By 10 the Quotient is 12345678, and the Remainder (9.)

By 100 the Quotient is 1234567, and Remainder 78.

By 1000 the Quotient is 123456, and Remainder 789.

By 10000 the Quotient is 12345, and Remainder 6789.

When the Divisor consisteth of several Figures, then there ariseth a little more Difficulty in the Work; but if the following Directions are heedfully attended to, the seeming Difficulty is easily overcome; as in the succeeding Example, viz.

Suppose

Suppose I am to divide 78901 Pounds among 32 Parishes ; or suppose an Assessment of so much Money was laid on so many Parishes ; what must each Parish pay by an equal Proportion towards the raising such a Supply ?

Divisor 32) 78901 (..... Quotient.

The Example thus set out, I begin at the Left-hand, seeking how often I can take 32 out of 78 ; or more easy, how many times 3 is there in 7, and the Answer is two times ; which I place in the Quotient thus, 32) 78901 (2 and then according to the *General Rule of Working*, I multiply the Divisor 32, by the 2 placed in the Quotient, saying, twice 2 is 4, and twice 3 is 6 ; so there is 64 to be taken out of 78, and stands thus :

$$\begin{array}{r} 32) 78901 (2 \\ \underline{64} \end{array}$$

14

Then I make a Point under 9, the Third Figure of the Dividend, and bring it down to the Remainder 14, and then the Work appears thus :

$$\begin{array}{r} 32) 78901 (2 \\ \underline{64} \end{array}$$

140

Then I seek again, asking how many times 32 in 149 ; which is not readily to be answered ; but how many times 3, the first Figure of the Divisor, is there in 14 the two first Figures of the Dividual 149, and the Answer is 4 times ; wherefore after placing 4 in the Quotient, I multiply (as directed in the *General Rule*) the Divisor 32 by the said 4, saying, 4 times 2 is 8, placing it under 9 in the Dividual ; then 4 times 3 is 12, and set it down under 14 ; so there is

G 2

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128 to be taken out of 149, and then the Work appears thus:

32) 78901 (24

64..

149

128

210

And after Subtraction there remains 21; then I make a Point under 0 in the Dividend, and bring it down to the Right of the Remainder 21, and then there is 210 for a new Dividual; then, as the General Rule directs, I seek again, saying, how many times 32, the Divisor, is there in 210 the Dividual; or easier, how many times 3 in 21? (¶ For observe well, That whenever you have a Place more in the Dividual than in the Divisor, then always seek how oft you can take the first Figure of the Divisor out of the two first of the Dividual) and the Answer is 7 times; but it will not bear 7 times, for 7 times 32 is 224, and you cannot take 224 out of 210; or rather, you cannot take 22 out of 21, wherefore try in your Mind before you set down the Answer, or Figure in the Quotient, whether it will go the Number of times as is most easily suggested; as here, the Question or Demand is readily answered 7 times; and so many times 3 may be taken in 21; but when you come to multiply the whole Divisor by the times you place in the Quotient, you begin at the Right-hand, and go towards the Left, carrying the Tens that arise to the next Place, which increases the Product so, that sometimes Subtraction cannot be made because the under Line is greater than the upper, or that which you should subtract from; wherefore first try in your Mind as abovesaid; and since it will not bear 7 times, try if it will go 6 times; saying, 6 times 2 is 12; 2 and carry 1, and 6 times 3 is 18, and 1 is 19; and 19 may be taken out of 21, therefore set down 6 in the Quotient next to the 4, and multiply

multiply the Divisor 32 by it, and the Work will stand thus :

32) 78901 (246

64

149

128

210

192

18

18

18

18

18

18

18

18

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18

Here the Divisor 32 multiplied by 6, gives 192 to be taken out of 210, and the Remainder is 18 ; to which, after a Point made under it, I bring down the 1, the last Figure of the Dividend, and then there is 181 for a new Dividual ; then

according to the Rule, I seek again, (for you are to Note, That the *aforesaid General Rule for Working* must be as often repeated as you bring down a Figure or Cypher from the Dividend, to make a new Dividual ; and also, That for every Figure or Cypher brought down, there must likewise be a Figure or Cypher placed in the Quotient ;) how many times 32 the Divisor may be taken out of 181 the Dividual ; or how many times 3 in 18, and the ready Answer is 6 times ; but on tryal I find it will not go 6 times, wherefore I try a time less by 1, viz. 5

times, and find it will bear it ; and setting 5 in the Quotient next to the 6, I multiply the Divisor 32 by it, and it produces 160 ; which subtracted from 181, the last Remainder is 21, and the Quotient or Answer is 2465 ; and shews that 32 is contained in 78901, 2465 times, and 11 over, as *per Work*.

32) 78901 (2465

64

149

128

210

192

181

160

21

21

21

21

21

21

21

21

21

21

21

21

G 3

Again,

Again, Admit a Nobleman hath 30000 *l.* per Annum, what is his daily Income?

If you divide 30000 by 365 (the Days in a Year,) the Quotient will be the Answer. Set it down for Working thus,

$$365) 30000 ($$

First seek how many times 365 can be taken in 300; (an equal Number of Places with the Divisor;) answer 0 times; wherefore I go a place further to the Right-hand, in the Dividend, (for 0 must never begin the Quotient, as was said before) and make a Point under it, *viz.* under the last 0 but one, as may be seen in the Example; and there being a place more in this pointed out Dividend than in the Divisor, I seek how oft the first Figure of the Divisor, *viz.* 3, is contained in the two first Figures or Places of the Dividend, *viz.* 30, and the answer is 10 times; but you are never to take above 9 times at once, in any of these Examples of Division, wherefore try in your Mind whether it will bear 9 times, before you set it down in the Quotient, (as was said before,) saying to yourself, or in your Mind, 9 times 5 is 45; 5 and go 4; and 9 times 6 is 54, and 4 is 58; 8 and go 5; and 9 times 3 is 27, and 5 is 32; now 32 cannot be taken out of 30, wherefore take a time less by a Unit or One, *viz.* 8 times; and finding it will go 8 times, set 8 in the Quotient; and then say; 8 times 5 is 40; 0 and carry 4; and 8 times 6 is 48, and 4 is 52; 2 and carry 5; and 8 times 3 is 24, and 5 is 29; and then there is 2920 to be taken from 3000; and after Subtraction the Work appears thus:

$$\begin{array}{r} 365) 30000 (8 \\ \underline{2920} \end{array}$$

80

Then

Then to the Remainder 80, I bring down 0, the last of the Dividend, and then there is 800 for a New Dividual; then you must try how oft you can take 365 out of the said Dividual 800, and the Number of Places being equal both in Divisor and Dividual, to wit, 3, ask how oft 3 in 8; answer twice; so put 2 in the Quotient, and say, twice 5 is 10; 0 and carry 1; and twice 6 is 12, and 1 is 13; 3 and carry 1; and twice 3 is 6, and 1 is 7; so there is 730 to be deducted from 800, and the Remainder is 70, as in the whole Work may be seen, viz.

365) 30000 (82

2920

800

730

(70)

there would come out 3 s. a Day more, and there will be a Remainder of 305, which multiplied by 12, the Pence in a Shilling, produces 3660; which divided still *per* 365, gives 10 Pence a Day more: So that, 30000 l. a Year is l. 82-3-10 a Day.

Once more, Divide 46242 Gallons of Canary by 252, the Gallons in a Tun, thus set down:

232) 46242 (183

252

2104

2016

882

756

(126)

Thus by the Work the Nobleman hath Eighty-two Pounds *per Diem*, and 70 Pounds over; which if multiplied by 20, the Shillings in a Pound, would produce 1400 Shillings; which if divided *per* said Divisor 365,

In this Example, after inquiry, I find that it will not go twice; therefore I set down 1 in the Quotient, and place 252 under 462 of the Dividend, and after Subtraction the Remainder is 210; to which I bring down 4 from the Dividend, and the Dividual is 2104; and then seeking again, find it will bear 8 times; which placed

G 4

ced

ced in the Quotient, and the Divisor 232 multiplied by it, the Product is 2016 to be subtracted from 2104; which being done, the Remainder is 88; to which 2, the last Figure of the Dividend, being brought down, there is 882 for the last Dividual; and then seeking again, I find it will go 3 times; and the Product of the Divisor multiplied by 3, is 756; which subtracted from 882, there remains 126 for the last, or true Remainder: So that by this Division, I find there are 183 Tuns in 46242 Gallons, and 126 Gallons remaining, or over and above; which being half of 252 the Divisor, the Remainder is therefore half a Tun more.

When you have a Cypher or Cyphers in the Divisor in the First, Second, or Third Place, &c. separate such Cypher or Cyphers, with a Dash of the Pen, form the rest of the Divisor; and also cut off as many Figures or Cyphers from the Right of the Dividend, as you cut off Cyphers from the Divisor, and divide the remaining Figures towards the Left-hand by the remaining significant Figures of the Divisor.

Example.

Divide 47952 Square Poles of Land by 160, the Square Poles in an Acre of Land.

$$16|0) 429512 (268$$

32 ..

109

96

135

128

(7)

Acres, $\frac{7}{16}$ or $\frac{72}{160}$ or almost half an Acre.

Here the Cypher is cut off from the Divisor, and 2 from the Dividend; then I ask how oft 16 in 42; answer twice; then the 16's in 109, answer 6 times; then the 16's in 135, answer 8 times. So there are 268 Acres, and 7 remains; that is, 268

Divide

Divide 27|00) 62746|20 (2323 $\frac{25}{27}$ or $\frac{2520}{2700}$.

$$\begin{array}{r}
 54 \cdot \cdot \cdot \\
 \hline
 87 \\
 81 \\
 \hline
 64 \\
 54 \\
 \hline
 106 \\
 81 \\
 \hline
 \end{array}$$

In this Example, two Cyphers are separated from the Divisor, and also two Places from the Dividend, and then 62746 is divided only by 27. See the Work.

(25)

When the Divisor is 3, 4, 5, 6, or more Figures, there is a sure and easy Way of performing the Work truly, by making a Table of the Divisor; which may be done by *Addition*, or by multiplying the Divisor by 2, 3, 4, &c. Admit you are to divide 987654321 by 123456) 987654321 (8000 Times

987648;...	1	123456
(6321)	2	246912
	3	370368
	4	493824
	5	617280
	6	740736
	7	864192
	8	987648
	9	1111104

Here having noted the Number of Figures in the Divisor, which here is 6, I make a Point under the Sixth Figure, or Place of the Dividend, &c.

The foregoing Table is made by doubling the first Line, which is 246912 ; which added to the first or uppermost Line, gives the 3d Line 370368 ; which also added to the said first Line, makes 493824 for the 4th Line or Product ; and so of the rest ; still remembering to add the subsequent Line or Product to the first or uppermost Line, till you come to the last Line of 9 times, which is 1111104 ; the Truth of, which may be proved by Multiplying the first or uppermost Line by 2, 3, 4, 5, &c. and if you commit an Error by *Addition*, it may be found or corrected by *Multiplication*.

The Use of the said Table.

When you have pointed out your Number of Places in the Dividend, cast your Eye on the Table, and at the first View you may know how many times you can take ; as in this Example, 7 times is too little, and 9 times too much ; wherefore I set down 8 in the Quotient, and then multiply and subtract, and the Remainder is 6 ; to which I bring down 3, and put 0 in the Quotient ; then to the 63, I bring down 2, and place another 0 in the Quotient ; then to 632 I bring down 1, the last Figure of the Dividend ; but still it will not bear any Times or Time, wherefore I put another 0 in the Quotient ; and so the Work is done, and the Quotient is 8000, and the Remainder 6321 ; as in the Work.

Thus having plainly, fully, and pertinently shewn, by verbal Directions, the Method of Working Division ; I think it unnecessary to give any more Examples in that Manner, but shall leave some few Examples for Practice-sake, whose Quotients and Remainders are expressed, but the Operation omitted, to save Room, and for trial of the Ingenuity of Practitioners.

7400690042 divided by 987, the Quotient is 7498166, and Remainder 200.

479679002742 divided by 4689, the Quotient is 102298704, and Remainder 4566.

7969767002 divided by 976294, the Quor. is 8163, and Remainder is 279080.

456789012345 divided by 9876543, the Quotient is 46249, and Remainder 8775138.

764697 by 4500, Quotes 16993, and Remainder 1249. And,

8092320000 by 345000, Quotes 23456, and Remains (0.)

The Proof of Multiplication and Division.

THese two Rules reciprocally prove each other; for in proving *Multiplication*, if you divide the Product by the Multiplier, the Quotient will be like the Multiplicand; or if the Multiplicand, the Quotient will be the same with the Multiplier.

Example, No. 1.

$$\begin{array}{r}
 345 \\
 24 \\
 \hline
 7380 \\
 690 \\
 \hline
 24) 8280 (345 \\
 72 \\
 \hline
 108 \\
 96 \\
 \hline
 120 \\
 120 \\
 \hline
 (0)
 \end{array}$$

2.

Or thus,

$$\begin{array}{r}
 345) 8280 (24 \\
 690 \\
 \hline
 1380 \\
 1380 \\
 \hline
 (0)
 \end{array}$$

To prove Division.

Division may be proved by Division, thus :

If you divide the Dividend by the Quotient, the Quotient will be your former Divisor.

Example.

Divide 8280 by 345.

345) 8280 (24

Here the Working again is needless, it being in the Page foregoing ; and shews the Truth of the Assertion, that *Division* may be proved by *Division*, as aforesaid.

But the most usual Way of proving *Division* is by *Multiplication*, in this manner ; viz. multiply the Quotient by the Divisor, and the Product will be equal to the Dividend. Example of No. 1. in the foregoing Page.

345 Quotient

24 Divisor

1380

690

8280 Proof

Note, That when there is any Remainder, such Remainder must be taken in or added to the Product.

As in *Multiplication*, I gave some Examples of its Utility in Money, so likewise I shall give a few Examples in *Division of Money* ; whereby may be seen how expeditiously some Things may be done, without having recourse to Reduction, the Rule of Three, &c. viz.

Example 1.

Divide 26 l. 12 s. 6 d. equally among Five Men : For Disposition of Working, set it down as follows.

$$\begin{array}{r} \text{l.} \quad \text{s.} \quad \text{d.} \\ 5) 26-12-6 \\ \hline \quad 5-06-6 \\ \hline \quad \quad 5 \\ \hline \text{Proof } 26-12-5 \end{array}$$

In the working of this, I say, the 5's in 26, 5 times; 5 times 5 is 25, from 26, and there remains 1, or 1 Pound, or 20 Shillings; which with the 12 s. in the place of Shillings, makes 32 s; then the 5's in 32, 6 times; 6 times 5 is 30, from 32, and there remains 2 s. or 24 d. which with the 6 d. in the place of Pence, makes 30; then the 5's in 30, 6 times; and so the Work is done, and the Answer is, that each Man must have *l. 5-06-6* for his equal Share in the said Division of *l. 26-12-6* amongst 5 Persons; and the Truth of it is proved by Multiplication of Money, sufficiently shewn in the Rule of Multiplication; as here, 5 times 6 is 30; 6 and carry 2; and 5 times 6 is 30, and 2 is 32; 12 and carry 1; and 5 times 5 is 25, and 1 is 26, &c.

Example 2.

Divide the Charges of a Country Feast, amounting to *l. 246-13-4* equally amongst 12 Stewards, to know what each Steward must pay.

$$\begin{array}{r} \text{l.} \quad \text{s.} \quad \text{d.} \\ 12) 246-13-4 \\ \hline \text{Answer } 20-11-1\frac{4}{12} \end{array}$$

Here I say, the 12's in 24 twice, and the 12's in 6, 0 times, and there remains 6 l. or 120 s. and 13 s. make 133; then the 12's in 13 once, and the 12's in 13 once, and there remains 1 s. or 12 d. then 12 and 4 is 16; the 12's in 16 once, and 4 remains; so that each Steward must pay *l. 20-11-1 $\frac{4}{12}$* or four twelfths of a Penny, something more than a Farthing; and this may be proved as that above.

When any Quantity is such a Number that any two Digits of the *Multiplication-Table*, multiplied together, make the said Quantity or Number, then the Quotient may

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may be very expeditiously found at two Divisions, and sooner than at one. *Example*: Divide 7872 by 32. In this Example, the Digits, component Parts, or Ratio's, which multiply'd together, make the Divisor 32, are 4 and 8, or 8 and 4; for it matters not which of the Ratio's you divide by first; for either of which Divisions give a true, and the same Quotient; as may be seen by the different Methods of the following Work.

$$\begin{array}{r} 4) 7872 \\ \hline \end{array}$$

$$\begin{array}{r} 8) 1968 \\ \hline \end{array}$$

246 Quotient

$$\text{Or thus, } \begin{array}{r} 8) 7872 \\ \hline \end{array}$$

$$\begin{array}{r} 4) 984 \\ \hline \end{array}$$

246 Quotient.

Here though the Operations are divers, yet the Quotients are one and the same. Again, divide 44184 by 56.

Example 2.

$$\begin{array}{r} 7) 44184 \\ \hline \end{array}$$

$$\begin{array}{r} 8) 6312 \\ \hline \end{array}$$

789 Quotient.

Here the Divisors are 7 and 8, or 8 and 7; for either, or both, will give the same Quotient.

And thus may above Forty Examples be wrought by Numbers out of the *Multiplication-Table*, with great Dispatch and Expedition, as by 15, 18, 25, 35, 64, 72, 96, &c.

When it happens there is any Remainder in the first Division, or the last, or in both; to know the true Remainder as if you divided by the common Way, take this Method, *viz.* multiply the first Divisor by the last Remainder, and to it take in or add the first Remainder, if there be any, and the Product will be the true

true or same Remainder as if you divided by the long Way. *Example*; Divide 4567 by 15.

3) 4567

5) 1522—1

304—2

(7)

Here I multiply 3, the first Divisor, by 2, the last Remainder, and take in 1, the first Remainder, and it makes 7 for the true Remainder, as may be proved at Leisure, by the other way.

The same Observation and Method must be taken with respect to component Parts mentioned before, in Division of Money, as in Division of simple Numbers.

Example.

Divide 3) l. s. d.
463—18—06 into 18 equal Parts.

6) 154—10—10

Answer 25—15—01 $\frac{2}{3}$

By this Method of *Division of Money* (if the Quantity be as aforesaid made by even component Parts) you may, by having the Price of several Things, know the Price or Value of one Thing, at the said Rate, as well as by the *Rule of Three*: So doth *Multiplication of Money* answer Questions in the *Rule of Three*, when the first Number is a Unit or One.

Example by Division.

7) l. s. d.

If 84 lb. of Coffee cost 31—10—0 what is that a lb.?

12) 4—10—0

Answer 0—07—6 a Pound.

As in Multiplication of Money, to have an Answer you multiply the Price by the Quantity ; so in Division of Money, you divide the Price by the Quantity, to have your Answer.

I could speak more largely, if I had Room, of the excellent Uses that may be made of *Multiplication* and *Division* only ; but their various Uses will be better understood by their Application in the following Rules of *Arithmetick*, particularly in the next Rule, call'd,

REDUCTION,

WHich is an Application of MULTIPLICATION and DIVISION, shewing how to reduce Numbers of one Denomination to another, thereby discovering the same Value, tho' in different Terms.

1. As first, All Great Names are brought into Smaller by Multiplication, as Pounds into Shillings, Pence, or Farthings, by multiplying by 20, 12, and 4. Or Hundreds Weight into Pounds Weight, by multiplying by 4 and by 28, or by 112 ; or lower, into Ounces or Drans, by multiplying by 16 and 16.

2. And on the contrary, All small Names are brought into greater by Division ; as Farthings into Pounds, by dividing by 4, 12, and 20 ; and Pounds Weight into Hundreds Weight, by dividing by 28 and 4 ; and Drans into Pounds, by dividing by 16 and 16.

But you may Note, That Pounds only are brought into Pence, by multiplying by 240 ; or into Farthings, by multiplying by 960 ; and just the contrary by Division.

And for Weight, as expressed above.

The Sense, Meaning, and Use of *Reduction*, is express'd in the following Verses.

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Reduction shows how we of Names in Use,
 May Great to Small, or Small to Great, reduce;
 So that the Answer which shall thence arise,
 The given Sum in Value equalize;
 Multiply, or divide it, back you must;
 Which makes again your given Number just.

Example 1.

In 240 l. Sterling, how many Pence?
 20 Shillings 1 Pound.

4800 Shillings in 240 l.
 12 Pence 1 Shilling

Or thus,
240 l.
 240 d. in a l.

Ans. 57600 Pence in 240 l.

9600
480

Answer 57600 Pence.

Example 2.

In 226 Tuns of Copper, how many Pounds Wt.?
 20 C. 1 Tun

4520 Hund. Wt. in 226 Tuns
 4 qrs. 1 C.

Or thus,
226 Tuns
 20

18080 qrs. of a C. Wt. in 226 Tuhs 4520
 28 lb. 1 qr. of a C. 112

144640
36160

54240
4520

506240 Pounds Wt. in 226 Tuns.

506240 Pounds

These

These foregoing Examples are Great Names to be brought into Small, (as may easily be observed and understood;) therefore, as the first Rule directeth, it is done by Multiplication, by multiplying the greater Name by the Number of the next lesser Name that makes one of the said greater; as in the last Examples the lesser Name to Pounds is Shillings; wherefore I multiply by 20, because 20 of that lesser Name makes one of the said greater Name, *i. e.* 20 Shillings make a Pound. And the same regard is had, and Method observed, in the Example of Weight; as is very plain to be seen in the Work, and is called *Reduction Descending*, because it brings Higher or Greater Denominations into Lower or Lesser.

Example 3.

4)
Bring 494400 Farthings into Pounds.

Or thus.

12) 123600 Pence

96,0) 49440|0 (515 l.

2|0) 1030|0 Shillings

480.. In this
Way I di-
vide by
144 960 the
96 Farthings
480 in a Pound,
480 &c.

515 Pounds

(0)

In the first Way, I divide the Farthings by 4, because 4 of them make a Penny, and the Quotient is Pence; then these Pence I divide by 12, because 12 of them make a Shilling, and that Quotient is Shillings; which Shillings I divide by 20, to bring it into Pounds, thus; I cut off the Cypher in the Dividend towards

towards the Right, for the Cypher that is in the Divisor 20, which is also separated from 2 with a Dash of the Pen (as may be seen in the Work); then I halve the Figures one by one, as they are united with the Remainder in the Dividend; which half is Pounds, and is a short way of dividing by 20: In the Example I say, the half of 10 (because I must not set down 0 at the beginning) is 5, and the half of 3 is 1, and there remains 1; which makes the next, which is 0, 10; and the half of 10 is 5: So that 10300 Shillings make 515 Pounds, or there are so many Pounds in 494400 Farthings.

Note, In dividing by 20, as above, if any thing remains, it must be joined or annexed to the Figure or Cypher cut off; as suppose there had in halving the last Figure (excepting what you cut off) remained 1; which there doth never more, and then neither, but when the Figure halveth odd; I say, if there had remained 1, then it must have been joined to the Cypher separated or cut off, and then there would have been 10 Shillings.

Example 4.

Reduce 27552 Pounds Weight into Hundreds Wt.

$$\begin{array}{r} 4) \\ 28) 27552 \quad (984 \\ 252 \dots \end{array}$$

246 C. wt. Answer

$$\begin{array}{r} 235 \\ 224 \end{array}$$

112

112

(0)

Or thus.

1.

$$112) 27552 \quad (246 \text{ Ans.}$$

$$224 \dots$$

515

448

672

672

(0)

In

In the first of the two foregoing Examples I divide the Pounds by 28 to bring them into Quarters; then I divide those Quarters by 4, to bring them into Hundreds Weight, as in the Work.

In the second Way, I divide the Pounds Weight by 112, the Pounds in a C. Weight, and it brings the Pounds Weight into Hundreds Weight at once.

The said Examples are of Small Denominations to be brought into Greater; and therefore, according to the second Rule of Direction, it is done by Division, by dividing the lesser Name by as many of them as make the next greater Name; that is, by 28, because 28 of them makes one of the next greater Name, *viz.* a Quarter of a Hundred; and this Reduction is called *Reduction Ascending*, because it brings low or small Names to higher or greater Denominations. — By which may be observed, That all Questions in Reduction, whether Ascending or Descending, are answered either by Multiplication or Division, or by both; as will plainly appear in the sundry Examples of Reducing of divers Denominations to others.

When it is required to reduce Numbers of several Denominations by *Reduction Descending*, or by *Multiplication*, you are to work as before; but you must always remember to take in such Numbers as stand in the Place of the next inferior Denomination; as when you multiply the Pounds by 20, if there be any Shillings in the Denomination or Place of Shillings, you must take them in: So likewise when you multiply the Shillings by 12, if there be any Pence in the Place of Pence, you must also take them in: And so when you multiply the Pence by 4, to bring them into Farthings, you must take in the Farthings, if there be any, in the Place of Farthings, as in the following Work.

Example

Example 5.

l. s. d.

In 346—16—9 $\frac{1}{2}$ how many Farthings?

20 Shillings 1 Pound.

6936 Shillings in 346 l. 16 s.

12 Pence 1 Shilling.

83241 Pence in 346 l. 16 s. 9d.

4 Farthings 1 Penny.

332966 Farthings in 346 l. 16 s. 9 d. $\frac{1}{2}$.

The Example is so plain in the Work, that it hardly needs any Explication ; but I begin and say 0 is 0, but 6 in the Units of Shillings is 6 ; then twice 6 is 12 ; and 1 in the Tens of Shillings is 13 ; 3 and carry 1 ; and twice 4 is 8, and 1 is 9, and twice 3 is 6 ; then by 12, saying, 12 times 6 is 72, and 9 d. (in the place of Pence) is 81 ; 1 and carry 8 ; and 12 times 3 is 36, and 8 is 44 ; and 4 and carry 4 ; and 12 times 9 is 108, and 4 is 112 ; 2, and carry 11 ; and 12 times 6 is 72, and 11 is 83, &c.

Example 6.

C. qrs. lb.

In 56—2—16 of Tobacco, how many lb. wt.

4 qrs. 1 C.

226 qrs. in 56 C. 2 qrs.

28 lb. 1 qr. of a C.

1814

453

Ans. 6344 Pounds Weight in 56 C. 2 qrs. 16 lb.

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In the foregoing Work, I first multiply the 56 C. by 4, and take in the two Quarters; and then I multiply the 226 qrs. by 28, saying, 8 times 6 is 48, and 6 (the Unit Figure in the odd Pounds) is 54; 4, and carry 5, &c. Then I multiply by 2, saying, twice 6 is 12, and 1 (that stands in the Place of Tens in the odd Pounds) is 13; 3, and carry 1, &c. Then adding the two Products together, they make 6344 Pounds, contained in 56 C. 2 qrs. 16 lb. as in the Work is conspicuous. Or, the Example may be sooner done by multiplying the 56 C. by 112, the Pounds in a C. Wt. and taking in the odd Weight, viz. 2 qrs. 16 lb. or 72 Pounds at once, thus:

C.
56
112

672
56,72 odd Wt.

6344

I say here, 12 times 6 is 72; 2 and carry 7; and 12 times 5 is 60, and 7 is 67; then once 6 is 6, setting it down in the third place, because by multiplying by 12 at once, two places are taken up: See the Work.

Or still briefer thus, by setting down the 56 C. four several times, in the following Manner; taking in the odd Weight, as before.

56 C.
56
56
56,72

6344 Pounds,

The same as above, viz.

Reduction

Reduction Ascending.

Is the bringing Numbers from a lesser Denomination to a greater, and is the Converse of *Reduction Descending*; and each may serve as a Proof to the other, one being performed by *Multiplication*, and the other by *Division*.

And Note, That when at any time in *Reduction Descending* you take in, or add to, the odd Money, Weight, or Measure, as you multiply the several Denominations, such Quantities will be Remainders in *Reduction Ascending*. Example by the two foregoing Sums.

4)
In 332966 Farthings, how many Pounds?

12) 83241 — $\frac{1}{2}d.$ remains what taken in.

2,0) 693,6 — 9 *d.* remains what taken in.

346 — 16 *s.* remains what taken in.

So that in 332966 Farthings there are 346*l.* 16 *s.* 9*d.* $\frac{1}{2}$, and is a sure Proof of the foregoing Work Descending.

Again, In 6344 Pounds Weight, how many Hundreds Weight?

28) 6344 $\frac{4}{226}$ qrs.

56

56 C. 2 qrs taken in.

74

56

184

168

(16) rem. Pounds taken.

So that in 6344 Pounds Weight, there is 56 C. 2 qrs. 16 *lb.* and proves the foregoing Example Descending to be right.

Now

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Now follow promiscuous Examples of both Kinds of Reduction, one proving the other.

In 276 l. 12 s. how many Pence?

20

12

In 66384 d. how many l.?

5532

12

2|0) 553|2

*Ans*w. 66384 Pence *Ans*. l. 276 | 12 and Proof.

In 47964 Grains, how many Pounds Troy?

20

24) 47964 (199|8

24...

12) 99 — 18 p. wts.

236

216

In 8 lb. 03 oz. 18 p. w. 12. gr. *Answer*
how many Grains?

12

236

216

99

20

204

192

1998

24

gr. (12)

7924

3997

Answer 47964 and Proof.

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In 34 C. $\frac{3}{4}$ of Cotton Wooll, how many Pounds?

34
34
34|84

112) 3892 (34 C. $\frac{3}{4}$ Proof.
336

3892 Pounds

532
448

(84) lb. or $\frac{3}{4}$ of a C.

In 456 C. 3 qrs. 27 lb. of Copper, how many Pounds? And what comes it to, at 21 d. per lb.?

456 C.
456
456
456
5111

Or thus,
C.
456
112

51183 Pounds
21 d. per lb.

5472
456
5111

51183
10366

51183 Pounds

154843 Pence; which bring into Pounds by *Division*,
or *Reduction Ascending*, as before shewn, and
it will amount to l. 645-3-7.

Bring 4796 Ells Flemish into Ells English; multi-
ply by 3, and divide by 5, be-
cause 3 Quarters make an Ell
Flemish, and 5 an Ell English.

5) 14388

2877 $\frac{3}{5}$

H

Reduce

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Reduce 456 Ells English into Yards; multiply by 5, and divide by 4, thus:

456 English Ells
 5 qrs 1 E. Ell. In 570 yds how many E. E?
 4 yds 1 qr.

4) 2280 qrs

5) 2280

Yds 570 *Answer*

E. Ells 456 *Answer and Proof.*

Bring 130 Tuns of Wine into Gallons.

4 Hhds 1 Tun

Or thus,

520

252 Gall. 1 Tun.

63 Gallons 1 Hhd.

130 Tuns

1560

7560

3120

252

Ans. 32760 Gallons

32760

And so the Contrary by *Division*.

Lasts Quart. Bushels Pecks

Reduce 42—3—5—2 into Pecks.

10 qrs 1 Last

Here I multiply by 10, and take in 3 qrs. and then by 8, and take in 5 *Bushels*; and lastly, by 4, and take in 2 *Pecks*.

423 qrs

8 bush. 1 qr.

3389

4 pecks 1 bush.

13558 Pecks, in 42 Lasts, 3 Quarters, 5 Bushels and 2 Pecks.

In

4) 13558 Pecks, how many Lafts, &c?

8) 3389 — 2 Pecks taken in.

10) 42 | 3 — 5 Bushels taken in.

Lafts 42 — 3 Quarters taken in.

Answer, 42 Lafts, 3 Quarters, 5 Bushels, and 2 Pecks.

Thus by the two foregoing Examples it is seen, that *Reduction Ascending* and *Descending* mutually prove each other, as was said before; and is no more than that *Multiplication* and *Division* prove one another.

By *Reduction* also,

Foreign Coins or Exchanges may be reduced to Sterling Money; and on the contrary, Sterling Money to Foreign.

Example.

Reduce 246 Venetian Ducats *de Banco* into Sterling Money, the Exchange at 52 *d.* Sterling *per* Ducat, thus:

246

52

492

1230

12) 12792

20) 10616

l. 53,6

To be paid in London, for the 246 Ducats drawn in Venice.

H 2

Reduce

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Reduce 53 l. 6 s. Sterl. into Ducats at 52 d. Sterling
per Ducat.

$$\begin{array}{r} 20 \\ \hline 1066 \\ 12 \\ \hline \end{array}$$

52) 12792 (246 Ducats to be paid in Venice for the
104 53 l. 6 s. drawn in London.

23, &c.

To reduce *Flemish* Money into *Sterling* Money, di-
vide the Pence *Flemish* by the Par of Exchange, viz.
33 s. 4 d. and the Quotient will be the *Sterling* Mo-
ney; and what remains multiply by 20, &c.

Example.

In 242 l. 13 s. 4 d. *Flemish*, how
20 many Pounds Sterling,
&c?

$$\begin{array}{r} 33 \text{ s. } 4 \text{ d. Flemish} \\ 12 \overline{) 4853} \\ 12 \end{array}$$

$$\begin{array}{r} 400 \\ \hline 4 \overline{) 100} \end{array}$$

$$582 \overline{) 40}$$

l. 145 Sterling.

$$\begin{array}{r} \text{Remains } 240 \\ 20 \end{array}$$

$$4 \overline{) 100} \quad 48 \overline{) 00}$$

12 shillings Sterling.

By the Work it appears that 145 l. 12 s. Sterling,
answers or is equivalent to 242 l. 13 s. 4 d. *Flemish*,
at 33 s. 4 d. *Flemish* per pound Sterling.

Thus

Thus *Flemish Money* may be reduced to *Sterling Money*, though the Par of Exchange be at any other Rate of Shillings and Pence *Flemish*: But when at the Rate as above, viz. 33 s. 4 d. (the common Par) then the Answer is sooner found by multiplying by 3, and dividing by 5; for 400 d. *Flemish* is the same to 240 d. *Sterling* (each being a Pound) as 3 is to 5; for if you divide 240 by 3, it quotes 80: So 400 divided by 5, quotes the same.

The foregoing *Example* done by the last proposed Way.

l. 240—13—4 *Flemish*

3

5) 722—00—0

l. 144—08—0 *Sterling*.

Note, *French Money* is reduced to *Sterling*, viz. *Li- vres*, *Soulze*, and *Deniers* (or *French Pence*) as *Sterling* and *Flemish Money* is, by multiplying by 20 and by 12.

In 426 *French Crowns*, each 54 d. $\frac{2}{3}$ *Sterling*, how many Pounds, &c. *Sterling*?

426

54

1704

2130

106 $\frac{2}{3}$ or $\frac{1}{2}$ d.

12) 23110—10d.

210) 19215

Answer l. 96-5-10 $\frac{1}{2}$ *Ster.* swer is l. 96-5-10 $\frac{1}{2}$ *Ster-*
ling: As in the Work.

H 3

Again,

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Again, bring 1600 pieces of Eight: *Mexico*, at 54 d. $\frac{2}{3}$ *Sterling*, into Pounds, &c. *Sterling*.

1600
 54
 ———
 6400
 8000
 200
 200
 ———

Here the 1600 pieces of Eight are multiplied by 54, to bring them into Pence; and for the $\frac{2}{3}$ I take the $\frac{1}{3}$ of 1600 twice, &c. as in the Work. And the Answer is *l.* 361-13-4.

12) 86800 Pence.

2|0) 723|3—4

l. 361, 13, 4

This Method is of Use in reducing the Exchanges of *Cadiz*, *Leghorn*, and *Genoa*. Or when the Exchange is at so many Pence, and Eights of a Penny, (as often the Exchanges run) then multiply the given Number to reduce it into Pence, by the Pence contained in a piece of Eight; and also multiply the said given Number apart, by the Numerator or upper Figure of the Fraction, and divide by the Denominator or under Figure of the Fraction, and the Quotient will be Pence; which add to the other Pence produced by multiplying the given Number by the Pence contained in one of the pieces for Exchange; then divide the Total Pence by 12, &c.

Example.

Example.

Bring 296 Dollars, at 52 d. $\frac{6}{8}$ Sterling, into Pounds, &c. Sterling.

$$\begin{array}{r}
 296 \\
 52 \overline{) 296} \\
 \underline{592} \\
 1480 \\
 \underline{15392} \\
 222 \\
 \underline{12) 15614} \\
 210 \overline{) 13011-2}
 \end{array}$$

296 Dollars

6

1) 1776

222 Pence

Answer, l. 65, 1, 2 Sterling Money due for 296

Dollars, at 52 d. $\frac{6}{8}$ Sterling per Dollar.

But *Ducats, Dollars, Crowns, Millreals, &c.* are more expeditiously cast up, by the Rules of Practice hereafter to be shewn.

And so much for *Reduction*. The next Rule in *Arithmetick*, is,

The Golden Rule, or Rule of Three.

IT is called the *Golden Rule* from its excellent Performances in *Arithmetick*, as in other Parts also of *Mathematical Learning*.

And the *Rule of Three*, because from three Numbers given, proposed, or known, we find out a fourth Number required, or unknown; which bears such Proportion to the Third as the Second doth to the First Number. From whence also it is called *The Rule of Proportion*.

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And of this *Proportion* there are two Sorts ; one called *direct* ; and the other *Indirect*, or *Reverse*.

Direct Proportion is, when the Second and Third Numbers are multiplied together, and their Product is divided by the First.

Indirect or Reverse Proportion is, when the First and Second Numbers are multiplied together, and their Product is divided by the Third.

In *Direct Proportion*, the Fourth Number, or Answer to the Question, contains the Third Number as often (or as many times) as the Second contains the First.

But in *Indirect Proportion*, the greater the Third Number is, the less is the Fourth ; and the lesser the Third Number is, the greater is the Fourth.

The stating the Question.

The chiefest Difficulty that occurs in the *Rule of Three*, is the right placing the Numbers, or stating the Question : For when that is done, you have nothing more to do, but to multiply and divide, and the Work is done.

And to this End, we are to remember, that of the Three given Numbers, Two of them are always of one Name or Denomination ; and the other Number is ever of the same Name with the Fourth Number or Answer required ; and must always be the Second or Middle Number : And the Number that asketh the Question, must still possess the Third or Last Place ; and the other Number of the same Name with the Third, must be First Number : For, the First and Third Numbers must always be of one Name, viz. both Money, both Weight, both Time, or both Measure. And though they be of one Kind, yet if one of them is altered, by *Reduction*, from a high to a lower Name, then the other must be reduced to the same Name. For you must particularly Note, *That if either*
the

the first or third Numbers consist of several Denominations; that is, of Pounds and Shillings; or Pounds, Shillings, and Pence; or of Pounds, Shillings, Pence, and Farthings; or of Tuns, Hundreds, Quarters, and Pounds, &c. then must they be reduced to the lowest Name mentioned. And if one happen to be of divers Denominations, and the other but of one Name; then the Number of one Name must be reduced as low, or into the same Name with the other: As suppose the first Number is brought into Farthings, then the third Number, though but Pounds, must be brought into Farthings also. Then you are to multiply the second and third Numbers together, (when the Proportion is Direct) and divide the Product by the first Number, and the Quotient thence arising will be the Answer to the Question, and in the same Name with the middle Number: And if in a small Denomination, it must be brought by Division to the highest Name, for the better understanding the Answer. You must also Note, That if the middle Number be of several Denominations, it must be brought into the lowest mentioned.

Example 1.

If 12 Gallons of Brandy cost 4 l. 10 s. what will 134 Gallons cost at that Rate?

Stated for Working thus:

Gallons	l.	s.	Gallons
If 12	4	10	134
	20		90
	90		
		12)	12060
			1005
			l. 50½ Answer.

Here the first and third Numbers are of like Name, viz. Both Gallons; and 134 being the Number that asketh

H 5

asketh the Question, it hath the third Place, as it always must, as before asserted; and 4 *l.* 10 *s.* the second Number, being of 2 Denominations, *viz.* Pounds and Shillings, it is reduced into the lowest mentioned, *viz.* Shillings, as before directed, and then the three Numbers are these, *viz.* 12—90—134; and 134 the third Number, being multiplied by 90, the second Number, produces 12060; which divided by 12, the first Number, quotes 1005 Shillings, the Name of the Middle Number 90; and 1005 Shillings divided by 20, gives 50 *l.* 5 *s.* for the Answer: And for the Proof of its Truth, state it back again thus:

Example 2.

Gallons	<i>l.</i>	<i>s.</i>	Gallons.
If 134 cost 50—5 what 12?			

20

1005

12

134) 12060 (90 *s.* Answer, or 4 *l.* 10 *s.*

1206

the Cost of 12 Gallons,

and is a sure Proof of

the first Work; and the back stating and working the Proof, is as much a Question in the Rule of Three as the first.

By the foregoing Rules and Directions, and these two Operations, you may understand the Nature of the Rule, and Method of Working, and with Ease and Certainty answer any Example proposed in the Rule of Three Direct: And therefore, I shall omit what I can of verbal Directions, and abate as much of Figure Work as is consistent with Dispatch, and of not leaving the Work too obscure; to save Room, and not to be too prolix; and to this End, I shall only give the Examples stated, and a little of the Work,

Work, and the Answers to the Questions ; leaving most of the Operations to be performed by the ingenious Practitioners.

Example 3.

If 56 lb. of Indigo cost 11 l. 4 s. what will 1008 lb. cost at that Rate ?

lb. s. lb.

If 56—224—1008 ? *Answer*, 4032 Shillings, or l. 201, 12.

Example 4.

If half a C. Wt. of Rose Copper cost 4 l. 18 s. what Quantity will 14 s. buy at that Rate ?

s. lb. s.

If 98 buy 56 what 14 ? *Answer*, 8 lb. of Copper.

Example 5.

X If 4 C. 3 qrs. of Sugar cost l. 5-15-7. what will 4 Hhds come to, weighing 42 C. 1 qr. 14 lb. ?

lb. d. lb.

If 532—1387—4746 ? *Answer*, 12373 Pence; or l. 51-11-1. And the Remainder 266, multiplied by 4, gives 1064 ; which also divided by the first Number 532, gives a half-penny more ; so the Whole is l. 51-11-1½

Any of these Examples, or any other, may be proved by a back stating, according as the first Example was proved ; and each Proof becomes another Question in the Rule of Three, as was said before.

Example 6.

If I have 50 l. a Year Salary, how much is due to me for 144 Days Service at that Rate ?

D. l. D.

If 365—50—144 ? *Answer*, l. 19—14—6⅔ Parts of a Penny.

In this Example, the Product of the third by the second Number is 7200 ; which divided by the first 365, (according to Rule) Quotes 19 Pounds, the Name

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Name of the middle Number, and there is a Remainder of 265; which multiplied by 20, according to *Reduction*, and the Product still divided by 365, there comes out 14 Shillings; and yet there is a Remainder of 190, which multiplied by 12, and the Product divided by 365, gives 6 *d.* and there's a Remainder of 90; which if multiplied by 4 (the last inferior Name) and divided by 365, yet it would not come to a Farthing more; so that the Answer is as above, $l. 19-14-6\frac{22}{365}$.

You are to Note always, That when any thing remains that is reducible to an inferior or lower Name; after multiplied as above, it must continually be divided by the first Number.

Note also, When the first of the three given Numbers is an Unit, or One, the Work is performed, or Answer found, by Multiplication.

Example 7.

If I am to give 17 *s.* for 1 *lb.* of *Belladine Silk*, what must I give for 264 *lb.* at that Rate?

<i>lb.</i>	<i>s.</i>	<i>lb.</i>
If 1	17	264
	17	

Answer 4488 *s.* or 224 *l.* 8 *s.*

Example 8.

If I buy 49 Bags of Hops, at $l. 12-12-6$ per Bag, what come they to, at that Rate?

Bag	<i>l.</i>	<i>s.</i>	<i>d.</i>
If 1	12	12	6
			49 Bags
			7 and by 7.

88—07—6

7

618—12—6 Answer,

The

The foregoing Work is performed by the component Parts of *Multiplication of Money*, as taught in that Rule.

When the Third or Last of the Three given Numbers is an Unit or One, then the Work is performed by *Division*.

Example 9.

If 12 Ells of Holland cost 3 l. 6 s. what is the Price of 1 Ell at that Rate?

Ells 12) s. Ell

If 12—66—1 Answer 5 s. 6 d.

$5 \frac{6}{12}$ of 1 s. or 6 d.

Example 10.

If 56 Yards of Broadcloth cost 40 l. 12 s. what comes 1 Yard to at that Rate?

Yds 56) l. s. Yd

If 56—40—12—1 Answer 14 s. 6 d. per Yd

8) 5—16

0—14—6 d. Answer.

This Example is wrought by Division of Money, and by Component Parts; as before taught in the *Rule of Division*.

Example 11.

If A owes B 296 l. 17 s. and compounds at 7 s. 6 d. in the Pound; what must B take for his Debt?

s. d. s.

If 20—90—5937 Answer l. 111—6—4 $\frac{1}{2}$

Example 12.

If a Gentleman hath an Estate of 500 l. a Year; what may he expend daily, and yet lay up 12 l. 15 s. per Month.

First

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First multiply 12 *l.* 15 *s.* per 12, the Months in a Year, and it makes 153 *l.* which deducted from 500 *l.* the Remainder is 347 *l.* Then say,

Days 1.

If 365 — 347, what 1 Day? *Answer* 19 *s.*

After you have reduced the Pounds into Shillings, which make 6940; you divide them by 365, and the Quotient is 19 *s.* per Day.

The Rule of Three Reverse, or of Indirect Proportion.

WHAT *Indirect Proportion* is, hath been hinted already.

In *Direct Proportion*, the Product of the First and Fourth Numbers, is equal to the Product of the Second and Third.

But in this *Proportion*, the Product of the Third and Fourth Numbers, is equal to the Product of the First and Second.

The Method of stating any Question in this Rule, is the same with that of the *Direct Rule*.

For the First and Third Numbers must be of one Name, or so reduced, as in that Rule; and the Number that moves the Question must possess the Third Place; and the Middle Number will be of the same Name with the Answer, as it is there.

To know when the Question belongs to the *Direct*, and when to the *Reverse Rule*.

When the Question is stated as above-said; consider whether the Answer to the Question ought to be more or less than the Second Number; if more, then the Lesser of the First and Third Numbers must be your *Divisor*.

But

But if Less, then the Bigger of the two extreme Numbers must be your *Divisor*.

And if the First Number of the Three is your *Divisor*, then the *Proportion* is *Direct*; but if the Last of the Three given Numbers is your *Divisor*, the *Proportion* is *Indirect* or *Reverse*.

Or without Regard, either to *Direct*, or *Reverse*:

If more is required, the Lesser } is *Divisor*.
If less, the Greater }

Examples for Explanation.

Example 1.

If 4 Men plane 250 Deal Boards in 6 Days; how many Men will plane them in 2 Days?

If 6 Days require 4 Men, what 2 Days? *Answer*,
12 Men.

$$\begin{array}{r} \text{---} \\ 2) 24 \\ \text{---} \end{array}$$

12 *Answer.*

Example 2.

If a Board be 9 Inches Broad, how much in Length will make a square Foot?

In. B. In. L. In. B.

If 12 ——— 12 what 9 Inches broad?

12

$$\begin{array}{r} \text{---} \\ 9) 144 \\ \text{---} \end{array}$$

Answer 16 Inches broad.

In this Example, the First and Second Numbers are multiplied together, (as they always must be) and their Product is divided by the Third; as is the Example above it, and agreeable to the aforefaid Assertion; for in the first Example, it is most certain, that
2 Days

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2 Days will require more Hands to perform the Work than 6 Days ; therefore, the Lesser of the extreme Numbers is the *Divisor* ; and declares the Question is in the *Indirect Proportion*.

Likewise in the Second Example, 9 Inches in Breadth must needs require more in Length to make a Foot, than 12 Inches in Breadth ; wherefore it is in the same *Proportion* with the first Example, because the *Divisor* is the Third Number.

Example 3.

How many Pounds of Coffee, at 5 s. 9 d. per lb. is equivalent in Value with 426 Pounds of Tea, at 13 s. 4 d. per lb ?

d. lb. d. lb.

If 160 give 426, what 69 ? Answer $987\frac{57}{89}$.

Here it is manifest that there must be more Pounds of the Coffee than the Tea ; therefore 69 is the *Divisor*, which is the Third Number, &c.

Example 4.

How many Yards of Sarcenet, of 3 qrs. wide, will line 9 Yards of Cloth, of 8 qrs. wide ?

qrs wide. yds long. qrs wide.

If 8 ——— 9 what 3
8

Here the Narrower the Silk the more in Length is required.

3) 72

Yards 24 Answer.

Example 5.

If a Quartern Loaf weigh 4 lb. $\frac{1}{2}$ when Wheat is 5 s. 6 d. the Bushel ; what must it weigh when Wheat is 4 s. the Bushel ?

d. $\frac{1}{2}$ lb. d. lb.

If 66 ——— 9 ——— 48 Answer $6\frac{1}{2}$.

Example 6.

Example 6.

If in 12 Months 100 l. Principal gain 5 Pounds Interest; what Principal will gain the same Interest in 5 Months?

M.	l. P.	M.
If 12	100	5
	12	
	5) 1200	

Answer, 240 l. Principal.

The Double Rule of Three Direct.

IN this Rule there are Five Numbers given to find out a Sixth in Proportion to the Product of the Fourth and Fifth Numbers, as the Third Number bears to the Product of the First and Second Numbers.

Questions in this Kind of *Proportion*, are wrought either by two Operations in the *Single Rule of Three Direct*, or by a Rule composed of the Five given Numbers, and the one may be a Proof to the other; as may be seen in the Example following :

Example 1.

If 100 Pounds Principal, in 12 Months, gain 5 Pounds Interest; what will 246 Pounds Principal gain in 7 Months.

l.	l.	l.
If 100	gain 5	what 246
		5

1 00	12 30
	20

1|00) 6|00 *Answer 12 l. 6 s.*

Then

M. l. s. M.

Then say again, If 12 gain 12—6 what 7

$$\begin{array}{r}
 246 \\
 \hline
 7 \\
 \hline
 12) 1722 \\
 \hline
 20) 1436 \\
 \hline
 1. 7,3 6 \text{ Answer.}
 \end{array}$$

In the First stating, the Answer is, that if 100 l. gain 5 Pounds, the 246 l. will gain 12 Pounds 6 Shillings.

Then I say in the next stating; If 12 Months gain 12 l. 6 s. what will 7 Months gain? And the Answer of the Work is, l. 7—3—6. And so much will 246 Pounds gain in 7 Months, if 100 Pound gain 5 Pounds in 12 Months.

You must particularly note, That in all Operations where the Answer to the Question is found by two Rules of Three, the Answer of the first Stating is ever the middle Number of the second Stating, or Work; as in the preceding Examples is plainly seen.

The

The foregoing Question answered by a Rule composed of the 5 given Numbers, thus :

(1)	(2)	(3)	(4)	(5)
<i>l.</i>	<i>M.</i>	<i>l.</i>	<i>l.</i>	<i>M.</i>
If 100	12	5	246	7
12			5	
1200			1230	
			7	

In this Work, in stating the Question, the first and fourth Numbers are made of one Name, and the second and fifth ; and then the two first Numbers are multiplied together for a Divisor, and the last three Numbers are multiplied together for a Dividend, and the Quotient or Answer is in the same Name with the middle Number, viz. Pounds Interest, as in the Work I find the first Quotient 7 Pounds Interest ; and so I proceed from one Denomination to another, till I find the same Answer, as in the Work at two Statings, viz. *l.* 7—3—6.

This Method of Operation serves to answer all Questions in the *Double Rule of Three Direct*.

1200)	8610	(7 <i>l.</i>
	8400	
	210	
	20	
1200)	4200	(3 <i>s.</i>
	3600	
	600	
	12	
1200)	7200	(6 <i>d.</i>
	7200	
	(0)	

The Double Rule of Three Reverse.

IN this Rule you must place your Numbers in such Order, that your Second and Fourth Numbers may be of one Name or Denomination, and your Third and Fifth.

Example.

If 100 *l.* Principal, in 12 Months, gain 6 *l.* Interest; what Principal will gain 20 *l.* Interest in 8 Months?

Stated thus;

(1)	(2)	(3)	(4)	(5)
<i>l. P.</i>	<i>Mo.</i>	<i>l. Int.</i>	<i>Mo.</i>	<i>l. Int.</i>
If 100	12	6	8	20
12			6	

1200

20

48 the Divisor.

48) 24000 (500 *l. P. Answer.*

240

(0)

In this Work, the third and 4th Numbers are multiplied together for a Divisor; and then the first is multiplied by the second, and that Product by the 5th Number, and the Product 24000 is divided by 48, and the Quotient is 500 *l.* Principal; which is what will gain 20 *l.* Interest in 8 Months, and the Answer to the Question, as may be seen in the Work.

Rules

Rules of Practice.

THese Rules are so called from their frequent Use and Brevity in casking up most Sorts of Goods in Merchandize.

Note, That any Question in the Rule of Three, when the first Number in stating is 1, it is most briefly done by these Rules called Practice.

But previous to these Rules, it is necessary to have the following Tables by Heart.

Parts of a Shilling. Of a Pound. Parts of a Pound.

d.		s. d.
6 is	$\frac{1}{2}$	10 0 is
4	$\frac{2}{3}$	6 8
3	$\frac{3}{4}$	5 0
2	$\frac{4}{6}$	4 0
1 $\frac{1}{2}$	$\frac{5}{6}$	3 4
1	$\frac{6}{6}$	2 6
		2 0
		1 8
		1 0

Parts of a Shilling.

Example 1.

6 d. is | 426 Pounds of Sugar, at 6 d. per lb.

$\frac{1}{2}$ 1 s. | 210 21 | 3

1. 10 | 13 Answer.

Here 6 d. being the Price of each lb. and the half of a Shilling; therefore the half of 426 is taken, and gives 213 s. or 10 l. 13 s.

Example

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Parts of a Shilling.

Example 2.

4d. is $\frac{2}{5}$ | 512 lb. of Cheese, at 4 d. per lb.

of a s. |

2|0) 17|0—8 d.

l. 8, 10, 8 Answer.

Here 4 d. is $\frac{2}{5}$ of a Shilling; therefore the Third Part of 512 is 170 s. and $\frac{2}{5}$ of a Shilling, or 8 d. remains.

Note, *Always what remains is of the same Name with the Dividend, which here is Groats, for the Pounds of Cheese are at a Groat each.*

Example 3.

3d is $\frac{3}{4}$ | 246 yds of Ribband, at 3 d. per Yard.

of a s. |

2|0) 6|1— $\frac{2}{4}$ of a Shilling, or 6 d.

l. 3-1-6 Answer.

Here the Yards are divided by 4, because 3 d. is the 4th of a Shilling; and it quotes 61 Shillings, and 1 remains, or two 3 Pences: So the Answer is *l. 3-1-6*.

And thus may any proposed Question be answered, belonging to the first Table, or Parts of a Shilling; that is, by dividing the given Number by the Denominator of the Fraction, and the Quotient will be always Shillings, which (the Remainders being known as above) bring into Pounds, by dividing by 20, &c.

When the Price of the Integer is at a Farthing, a Half-penny, or three Farthings more than the Price of Pence mentioned, then for those Farthings take their even part of the foregoing Quotient taken for the even Parts of a Shilling, and add, &c.

Examples

Examples.

246 Ells of Canvass, at 4 d. $\frac{1}{2}$ per Ell.

$$\begin{array}{r|l}
 4d. \text{ is } \frac{1}{2} & 83 \\
 \frac{1}{2}d \text{ is } \frac{1}{8} & 10 \frac{3}{8} \text{ or } 4 d. \frac{1}{2} \text{ Answer.} \\
 \text{of } 4 d. & \\
 \hline
 2 \overline{) 09 \frac{3}{4}} & 4 \frac{1}{2} \text{ Answer.} \\
 \hline
 & l. 4-13-4 \frac{1}{2}
 \end{array}$$

In this Example I divide by 3 for the Groats, as being the Third of one Shilling, and it quotes 83 s. then I consider that a Half-penny is the Eighth of 4 d. therefore I take the Eighth Part of the Groat Line, or 83 s. and that produces 10 s. and $\frac{3}{8}$ of a Shilling, or 4 d. $\frac{1}{2}$; then the two Lines being added together, make 93 s. 4 d. $\frac{1}{2}$, or 4 l. 13 s. 4 d. $\frac{1}{2}$, as in the Work. Parts of a Pound.

10 s. $\frac{1}{2}$ | 254 Yards of Cloth, at 10 s. per Yard.

l. 127 Answer.

Here the half of 254 is taken, because 10 s. is the half of a Pound.

$$\begin{array}{r|l}
 s. d. & 972 \text{ Gallons at } 6 s. 8 d. \text{ per Gallon.} \\
 6--8 \frac{2}{3} & \\
 \hline
 & l. 324 \text{ Answer.}
 \end{array}$$

Here the third part is taken, because 6 s. 8 d. is the third of a Pound; and the Answer is l. 324.

And thus may any Question proposed be answered, belonging to the second Table, or Parts of a Pound; that is, by dividing the given Number by the Denominator

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minator of the Fraction, and the Quotient will be always Pounds; and if any thing remains, it is always so many Halves, Thirds, Fourths, or Fifths, &c. of a Pound, according to the Denominator that you divide by.

If the Price be Shillings and Pence, or Shillings, Pence, and Farthings, and no even Part of a Pound; then multiply the given Number by the Shillings in the Price, and take even Parts for the Pence, or Pence and Farthings, and add the several Lines together, and they will be Shillings; which Shillings bring into Pounds, as before.

Examples.

	l.	s. d.
	426	at 4--9
6 d.	4	
$\frac{2}{3}$		
3 d.	1704	
$\frac{1}{4}$	213	
	106	$\frac{2}{3}$ or 6d.
	2 0) 202 3	

l. 101-3-6 *Ans.*

	Ells	s. d.
3 d.	216	at 2--3 $\frac{1}{2}$
	2	per Ell.
$\frac{2}{3}$		
$\frac{1}{4}$ d.	432	
$\frac{3}{8}$ of	54	
3 d.	9	
	2 0) 49 5 s.	

l. 24|15 *Ans.*

	396	Gallons of Brandy, at 7 s. 9 d.
	7	per Gallon.
6 d. $\frac{2}{3}$ 1 s.	2772	
3 d. $\frac{1}{2}$ 6 d.	198	
	99	
	2 0) 306 9	

l. 153|9 *Answer.*

When

When the Price is 10 d. only annex 0 to the Right of the given Number, (which is multiplying by 10) and they are Pence; which divide by 12, and by 20:
Example; 426 lb. of Hops at 10 d. per lb.

12)

4260

2|0) 35|5

1. 17-15 *Answer.*

When the Price is 11 d. set down the Quantity twice in the Form of Multiplication, and add the two Lines together; then divide by 12, and by 20. *Example*,
 426 lb. of Copper, at 11 d per lb.

426

12) 4686 Pence.

2|0) 39|0|6

1. 19,10,6 *Answer.*

If the Price be 11 d. $\frac{1}{2}$, take half of the uppermost Line; &c. *Example*:

942 lb. of Tobacco, at 11 d. $\frac{1}{2}$

942 per lb.

471

12) 10833 Pence.

2|0) 90|2—9 d.

1. 45-2—9 *Answer.*

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When the Price is 1 s. only divide by 20.

Example.

2|0) 96|4 lb. of Tobacco, at 12 d. per lb.

1. 48-4 Answer.

When the Price is 2 s. it is done at eight by doubling the last Figure toward the Right-hand, and setting it apart for Shillings; and the Figures toward the Left are Pounds. *Example.*

596 Gallons of Spirits, at 2 s. per Gallon.

1. 59-12 Answer.

Here the double of 6 is 12 s. and the 59 are Pounds.

From this Method of Working by 2 s. a Multitude of Examples may be most expeditiously wrought, viz:

		Ells	Yards
	444 Cambrick	426	at 3s. 6d.
	— at 5s. 9d.	—	per yd.
	44—8 at 2 s.	42—12	at 2 s.
	44—8 at 2 s.	1 s. $\frac{1}{2}$ 2s.	21—6 at 1 s.
1 s. $\frac{1}{2}$ of 2 s.	22—4 at 1 s.	6d. $\frac{1}{2}$ 1s.	10—13 at 6d.
6d. $\frac{1}{2}$ of 1 s.	11—2 at 6d.		
3d. $\frac{1}{2}$ 6d.	5—11 at 3d.	<u>Answer L. 74-11 at 3-6d.</u>	

Answer 1. 127-13 at 5-9d.

The Operation of these two Examples is so intelligibly wrought, that there is no need of Verbal Explanation.

Again,

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Again, 548 yds of Broadcloth, at 12 s. 6 d. per yd.

l. 54, 16 at 2 s.
6 times 2 s. is 12 s.

6d. is 328, 16 at 12 s. Note, That 13 l. 14 s.
 $\frac{3}{4}$ of 13, 14 at 6 d. is the 4th part of 54 l. 16 s.
2 s. the two Shilling Line.

l. 342, 10 Answer.

Or multiply by 12 s. and take half of the given Number for the 6 d. thus:

$$\begin{array}{r} 548 \text{ Yards} \\ 12 \\ \hline 6576 \\ \frac{3}{2}) \quad 274 \\ \hline 2 \mid 0) 685 \mid 0 \end{array}$$

l. 342—10 Answer.

When the Price is an even Number of Shillings, multiply the Number of Integers by half the Price, and double the first Figure of the Product for Shillings, and carry as is usual in Multiplication, and the other Figures toward the Left will be Pounds.

Example.

296 Yards of Cloth, at 14 s. per yard.
7 the half of 14 Shillings.

l. 207—4 s. Answer.

Here 7 times 6 is 42; the double of 23. is 46
&c.

I 2

When

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When the Price is an odd Number of Shillings, work for the even Number as above; and for the odd Shillings, take the $\frac{1}{20}$ of the given Number, and add them together.

Example.

496 Gallons of Citron Water, at 17 s. per
8 the half of 16, the even part. (Gallon

396—16 s.

24—16

1. 421—12 Answer.

In this Example I say, 8 times 6 is 48; the double of 8 is 16 s. and carry 4; then 8 times 9 is 72, and 4 is 76; 6 and carry 7; and 8 times 4 is 32, and 7 is 39; then the half of 4 is 2, &c.

Even Parts of a Pound.

	Yards		Nobles s. d.
10s.	426 of Cloth, at 10 s.		429 at 6—8 each
is $\frac{1}{2}$	— per yard		
	213 Answer	6-8 d. $\frac{1}{2}$ l.	143 Answer.

lb.	598 of Cochineal, 4 s.	154 of Indigo, at 4s.
	— at 5 s. per lb. is $\frac{1}{5}$	— per lb.
5 s. l.	149 $\frac{3}{4}$ or 10 s. Anf.	l. 30 $\frac{4}{5}$ or 16 s. Anf.
is $\frac{1}{4}$		

3 s. 4 d. | 542 Zeland Dollars, at 3 s. 4 d.
is $\frac{1}{8}$ |
90 $\frac{2}{8}$ or 6 s. 8 d. Answer, l. 90 6-8 Sterl.

In all these Examples of Practice, I divide by the Denominator of the Fraction, and what remains is always

ways of the same Name with the Denominator ; as $\frac{1}{2}$, Thirds, Fourths, Sixths, or Eighths of a Shilling, or of a Pound, &c.

If the Price be half a Crown, divide by 8 ; if at 20 d. or 1 s. 8 d. divide by 12, &c. .

When the Price is Shillings and Pence, and no even part of a Pound ; multiply the given Number by the Shillings, and take parts of it for the Pence, as directed before.

Example.

4 d. $\frac{1}{2}$		246 Marks, at 13 s. 4 d.
1 s.		13
		738
		246
		82
		210) 32810 s.

For the Groat, I say the 3's in 24, 8 times ; and the 3's in 6, twice, &c.

l. 164 Answer.

But this Example may be sooner done by multiplying the given Number by 2, and dividing that Product by 3, (because a Mark is two thirds of a Pound,) thus: 246

$$\begin{array}{r} 2 \\ \hline 3 \overline{) 492} \end{array}$$

l. 164 Answer and Proof.

I have not here Room to speak of the various and almost infinite Methods and Rules of *Practice*, (having several other Subjects and Things to treat on) but shall leave some general Rules, which, if heedfully

I 3

noted,

nored, will be of great Use to Learners ; and are these, viz.

1. When the Price is parts of a Farthing, or of a Penny, as $\frac{3}{4}$, $\frac{5}{8}$, $\frac{7}{8}$, &c. then multiply the Integers by the Numerator, and divide by the Denominator, and the Result will be either Farthings or Pence ; which reduce to Pounds, &c.

2. When the Price is Pence, and no even Part of a Shilling ; as suppose 5 d. 7 d. 8 d. or 9 d. then it may be done by taking their Parts, as 3 d. and 2 d. is 5 d. and 4 d. and 3 d. is 7 d. and 4 d. and 4 d. is 8 d. and 6 d. and 3 d. is 9 d. but it is an easy and sure Way, to multiply the given Number by 5, 7, 8, or 9, and then the Product is Pence ; which reduce to Pounds by *Reduction*.

3. When the Price is Pence, and Parts of a Penny ; as 1 d. $\frac{1}{4}$, 2 d. $\frac{1}{2}$, or 6 d. $\frac{3}{4}$, then work for the Penny by taking the $\frac{1}{2}$; for 2 d. the $\frac{1}{4}$; and for 6 d. the $\frac{1}{2}$: Then for the Farthings, take $\frac{1}{4}$ of the penny Line ; and for $\frac{1}{2}$, $\frac{1}{4}$ of the two penny Line ; and for $\frac{3}{4}$, take $\frac{3}{4}$ of the 6 penny Line ; then add their Results together, and the Total will be Shillings, which reduce to Pounds by dividing by 20. Or by the sure Way of bringing the mixt Number into the lowest Denomination ; as 1 d. $\frac{1}{4}$, into 5 qrs. 2 d. $\frac{1}{2}$, into 5 half-pence, and 6 d. $\frac{3}{4}$, into 27 Farthings ; then multiply the Integers by 5, and the Product is Farthings ; or by 5 half-pence, and the Product will be half-pence ; or by 27 Farthings, and the Product will be Farthings ; which, whether Farthings or Pence, reduce to Pounds, &c.

4. When the Price is Shillings and Pence, or Shillings, Pence, and Farthings ; multiply the Integers by the Shillings of the price, and take parts for the Pence, or Pence and Farthings, &c.

5. If

5. If the Price be Pounds and Shillings, or Pounds, Shillings, Pence, and Farthings; multiply by the Shillings in the Price, that is, in the Pounds and Shillings, and take parts for the Pence and Farthings.

6. When the Number of Integers hath a Fraction annexed, or belonging to them; as $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, &c. then take $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$ of the Price of one of the Integers, and add that to the other Results.

Tare and Trett, &c.

Gross Weight is the Weight of the Goods in Hundreds, Quarters, and Pounds, with the Weight of the Hogshead, Cask, Chest, Bag, Bale, &c.

Tare is allowed to the Buyer for the Weight of the Hogshead, Cask, Chest, Bag, Bale, &c. that contains the Goods.

Trett is an Allowance made for Waste, Dust, &c. in sundry Sorts of Goods, as Tobaccos, Cottons, Peppers, Spices, &c. and is always 4 lb. per 104 lb. Suttle, and found by dividing the Suttle Pounds by 26, because 4 times 26 make 104 lb. When the Gross Weight is brought into Pounds, and before the Tare is deducted, they are called *Pounds Gross*; and after the Tare is subtracted, the remaining Pounds are called *Pounds Suttle*; which divided by 26 (as said before) quotes Pounds Trett, &c.

Tare at so much per Cask, Hogshead, Bag, &c.

The Allowances for Tare are variously wrought, as by the following Examples.

I. 4

In

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In 12 Casks of Indigo, containing 45 C. 1 qr. 14 lb. Gross, Tare 30 lb. per Cask, how many Pounds Nett?

12 Casks C. qr. lb.

45—1—14

360 Pounds Tare 45

45

45 42

5082 pounds Gross

subtract 360 pounds Tare

Answer 4722 pounds Nett.

In this Example, the lbs. Tare of one is multiplied by the number of Casks, and the Product is 360 pounds Tare; and the Gross Weight is reduced into pounds by the Method shewn in Reduction of Weight; and then the pounds Tare are deducted from the pounds Gross, and the Remainder are pounds Nett, viz. 4722, as in the Work.

When the Tare is at so much *per C. wt.* multiply the Number of Hundreds by the Tare, and take Parts for the odd Weight, and add it to the Tare found by Multiplication, and divide it by 112 to bring it into Gross Weight, in order for Subtraction. *Example.*

What is the Nett Wt. of 12 Casks of Argol, wt. gross

84 C. 2 qrs. 14 lb.

14 Tare per C.

336

84

7 for half C.

1 $\frac{3}{4}$ for 14 lb.

C. qrs. lb.

84—2—14 Gross

10—2—8 $\frac{2}{3}$ Tare

74—0—5 $\frac{3}{4}$ Nett Wt.

112) 1184 $\frac{3}{4}$ (10 C.

112

64 lb. or half a C. and 8 lb.

The

The Tare in the last Example is found to be, by the foregoing Directions, 10 C. 2 qrs. 8 lb. $\frac{3}{4}$, which subtracted as in the Work, leaves 74 C. 0 qrs. 5 lb. $\frac{1}{4}$ for the Nett Weight.

But the foregoing Example may be sooner done by Practice thus :

$$\begin{array}{r}
 \text{C. qrs. lb.} \\
 8) 84 \text{ --- } 2 \text{ --- } 14 \text{ Gross} \\
 \hline
 \text{sub. } 10 \text{ --- } 2 \text{ --- } 8 \frac{3}{4} \text{ Tare} \\
 \hline
 74 \text{ --- } 0 \text{ --- } 5 \frac{1}{4} \text{ Nett}
 \end{array}$$

In this Method, the Gross Weight is divided by 8, because 14 lb. is one eighth of 112 lb. and the Remainder is reduced into the next inferior Name, and still divided by 8 to the End, and then deducted as above, and the Nett Weight is the same as by the other way. And so may any Tare *per Cent.* be found, if the Tare be an even part of 112 lb. as 14 is one eighth, and 7 lb. is the half of that, and 16 lb. is one seventh, and 8 lb. is half of that, &c. that is, if the Tare be at 7 lb. *per C.* find it for 14 lb. as before, and then take the half of that for 7 lb. *per C.* Tare, the like for 8 lb. *per C.* Tare; take one seventh for 16 lb. and then the half of that for 8 lb. *per C.* Tare.

Of Trett.

What Trett is, when allowed, and how found, hath been said already; now I shall give an Example for Explanation, as follows:

I 5

Bought

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Bought Six Hogheads of Tobacco, containing Grofs and Tare as follows; viz.

No.	C.	qrs.	lb.	lb.
1 qt.	4	1	20	Tare 80
2	5	2	19	100
3	6	3	18	102
4	7	3	12	104
5	8	2	13	106
6	9	1	14	110
26) 4198 (161 lb. Trett	42	3	12	602
26 ..	42			
	42			
159	42	96		
156				
			4800 pounds Grofs	
38	subtract		602 pounds Tare	
26				
			4198 pounds Suttle	
12	deduct		161 $\frac{4}{3}$ pounds Trett	
			4036 $\frac{2}{3}$ pounds Nett	

There are some few other Rules, such as Barter, or exchanging Goods for Goods; also Exchanges of Coin, Profit, Loss, &c. but all of them being done either by the Rule of Three, or by Rules of Practice, it is therefore here unnecessary to enlarge upon them.

Of

Of Fractions Vulgar and Decimal.

WHAT *Fractions* are, hath already been hinted in the Rule of *Division*, from whence they arise; for the Remainder is a supposed Part of the Divisor; as admit 54 l. is divided into twelve equal Parts, the Quotient is 4, and the Remainder 6: So that here 6, is 6 parts of 12, or 6 twelfths, equal to a half; for 6 is the $\frac{1}{2}$ of 12; and set down in this Form $\frac{6}{12}$, and understood by these Names, viz.

6 Numerator.

12 Denominator.

The *Numerator* is above the short Line, and sheweth the Number of Parts; and the *Denominator* stands under the Line, and declares the Number of equal parts the Integer or whole Number is divided into; as above, 54 l. is divided into 12 parts, and the Quotient says there are 4 of those 12 parts contained in 54 , and 6 remains, or 6 twelfths of a Pound, or 10 s. as above-said.

Fractions are thus set down and read, viz. $\frac{1}{4}$, one fourth; $\frac{1}{2}$, one half; $\frac{1}{3}$, one third; $\frac{1}{5}$, one fifth; $\frac{1}{6}$, one sixth; $\frac{2}{3}$, two thirds; $\frac{2}{4}$, two fourths; $\frac{2}{6}$, two sixths; $\frac{5}{7}$, five sevenths, &c.

Fractions are either Proper or Improper: A Proper Fraction hath its Numerator less than the Denominator; as $\frac{5}{8}$, five eights; $\frac{24}{50}$, twenty-four fifty sixths, &c.

An Improper Fraction hath its Numerator greater than the Denominator; as $\frac{7}{3}$, seven thirds; $\frac{48}{15}$, forty eight fifteenths, &c.

Again, Fractions are either Simple or Compound; Simple, when part of an Integer or Thing hath but one Numerator, and one Denominator; as $\frac{1}{4}$ of a pound

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pound Sterling, $\frac{1}{2}$ a C. Weight, $\frac{2}{3}$ of a Tun, $\frac{5}{8}$ of a Gallon, &c. Compound, is a Fraction of a Fraction, as the $\frac{1}{2}$ of $\frac{1}{4}$ of a pound Sterling is equal to Half a Crown; or when one is divided into any Number of Parts, and those Parts again subdivided into Parts, &c.

Fractions are of two Kinds, *viz.* *Vulgar* and *Decimal*. *Vulgar* Fractions are as declared before. *Decimal* Fractions are artificially expressed by setting down the Numerators only, the Denominators being understood; and are always a Unit with as many Cyphers annexed as there are places in the Numerator; and therefore must be either 10, or some Power of 10, as 100, 1000, 10000, or 100000, &c.

Decimal Fractions appear as whole Numbers, (and in the general so wrought) but are distinguished from them by a Point or Comma prefixed thus, .5, and is read five Tenths; .32 thirty two Hundredths; .256 two Hundred 56 Thousandths: But of *Decimal* Fractions and their Use hereafter.

Reduction of Vulgar Fractions, is to fit or prepare them for Addition, Subtraction, &c.

1. *To reduce a mixt Number to an Improper Fraction.*

Rule.

Multiply the Integer by the Denominator, and take in the Numerator.

Example.

Reduce 12 Gallons $\frac{3}{4}$ to an Improper Fraction, thus,

4 Answer 51 Fourths, or 51 Quarts.

2. *To reduce an Improper Fraction to a whole or mixt Number.*

Rule. Divide the Numerator by the Denominator.

Example.

Example.

Reduce the last Example to a whole or mixt Number, viz. 51

$$4 \overline{) 51}$$

4

3 Remainder.

12

4 Divisor.

Here 12 Gallons is the whole Number, and $\frac{3}{4}$ the Fraction, the same with 3 Quarts.

3. To reduce Fractions to a common Denominator.

Rule.

Multiply the Numerator of each Fraction into all the Denominators, except its own, and the Product will be a new Numerator to that Fraction; and then do so by the next, &c.

Example.

Reduce $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{5}{6}$ of 20 s. or any other Integer or Thing to a common Denominator; say, twice 4 is 8, and 6 times 8 is 48, for a new Numerator to $\frac{2}{3}$; then say 3 times 3 is 9, and 6 times 9 is 54, for a new Numerator to $\frac{3}{4}$; lastly, say 5 times 4 is 20, and 3 times 20 is 60, the Numerator to $\frac{5}{6}$: Then, to find the common Denominator, say 3 times 4 is 12, and 6 times 12 is 72, the common Denominator: So that $\frac{48}{72}$ is equal to $\frac{2}{3}$, $\frac{54}{72}$ to $\frac{3}{4}$, and $\frac{60}{72}$ to $\frac{5}{6}$. And thus proved:

$\frac{2}{3}$ of a Pound is	13	4	48	} Added together make 162.
$\frac{3}{4}$ ditto	15	0	54	
$\frac{5}{6}$ ditto	16	8	60	

45 0

162 Common Denominator

Here the several Numerators are added together, and they make 162; which placed over the common Denominator 72, make the Improper Fraction $\frac{162}{72}$; and.

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and its Value is found as before directed, to reduce an Improper Fraction to a whole or mixt Number; as may be seen in the foregoing Page.

4. To reduce a Fraction into its lowest Terms.

Rule.

If they are even Numbers, take half of the Numerator, and Denominator as long as you can; and then divide them by any digit Number (*i. e.* 3, 4, 5, 6, &c.) that will leave no Remainder in either.

Example.

Reduce $\frac{56}{84}$ into its lowest Terms; say the $\frac{1}{2}$ of 56 is 28, and the $\frac{1}{2}$ of 84 is 42; and then, the $\frac{1}{2}$ of 28 is 14, and the $\frac{1}{2}$ of 42 is 21: So the Fraction $\frac{56}{84}$ is reduced to $\frac{14}{21}$. And since they both are not to be halved any longer; for though you can halve 14, yet you cannot 21, without a Remainder; try therefore to divide them by some other digit Number, and you will find, that 7 will divide both Numerator and Denominator without any Remainder; then say, the 7's in 14, twice; and the 7's in 21, 3 times: So is the Fraction $\frac{14}{21}$ reduced into its lowest Terms, $\frac{2}{3}$ two Thirds; and is the same in Value with $\frac{56}{84}$, and done in this Form:

$$\begin{array}{r|l|l|l|l} 2 & 2 & 7 & & \\ 56 & | & 28 & | & 14 & | & 2 \\ \hline 84 & | & 42 & | & 21 & | & 3 \end{array}$$

And the Certainty that $\frac{2}{3}$ is the same in Value with $\frac{56}{84}$ is found by multiplying any Integer by the Numerator of each Fraction, and dividing by the Denominator of each Fraction.

Example.

Example.

Let the Integer be 1 l. Sterling, or 20 s.

The best Way.

$$\begin{array}{r}
 s. \\
 20 \\
 2 \\
 \hline
 3) 40 \\
 \hline
 13-4 d. \\
 \hline
 \end{array}$$

The Common Way.

$$\begin{array}{r}
 s. \\
 20 \\
 56 \\
 \hline
 84) 1120 \text{ (13 s.)} \\
 84 \cdot \\
 \hline
 280 \\
 252 \\
 \hline
 28 \\
 12 \\
 \hline
 336 \text{ (4 d.)} \\
 336 \\
 \hline
 (0)
 \end{array}$$

13-4 d.

Here it is manifest, that by working by a Fraction in its lowest Terms, much Time and Figures are saved. In one Operation, 20, the Integer, is multiplied by 2, and the Product 40 divided by 3, and there remains 1, or $\frac{1}{3}$ of a Shilling, or a Groat, as in the other Work.

There are other Methods of reducing a Fraction into its lowest Terms; but, in my Opinion, none so ready as the foregoing.

5. To reduce a Compound Fraction into a Simple One of the same Value.

Rule. Multiply the Numerators together for a Numerator, and the Denominators together for a Denominator.

Example.

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Example.

Reduce $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{5}{6}$ of a Pound Sterling into a simple Fraction. Say twice 3 is 6, and 5 times 6 is 30, the Numerator: Then 3 times 4 is 12; and 6 times 12 is 72, the Denominator: So $\frac{30}{72}$ of a Pound is equivalent to $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{5}{6}$ of a *l.* Thus proved, $\frac{5}{6}$ of a *l.* is 16 *s.* 8 *d.* and $\frac{3}{4}$ of ditto, or 16 *s.* 8 *d.* is 12 *s.* 6 *d.* and $\frac{2}{3}$ of 12 *s.* 6 *d.* is 8 *s.* 4 *d.* the Answer: And multiplying 20 by 30, and dividing by 72, gives the same Answer, as in the following Work is plain.

20	}		
30			
72) 600 (8 <i>s.</i>			
576			
24 Remains		} 8 <i>s.</i> 4 <i>d.</i>	
12 Multiply			
72) 288 (4 <i>d.</i>			
288			
(0)			

6. *To find the Value of any Fraction, whether of Coin, Weight, or Measure.*

Rule. Multiply the Integer by the Numerator, and divide by the Denominator; and if any thing remain, multiply it by the Number of Units of the next inferior Denomination.

Example.

What is $\frac{30}{72}$ of a Pound, or 20 *s.*? (the foregoing Example of Proof to the Compound Fraction $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{5}{6}$) and as it is worked there, it need not again be repeated.

Again,

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Again, What is $\frac{5}{6}$ of a Tun Weight?

C.

20 the Integer.

5 the Numerator.

The Denominator 6) 100

C. 16—4 remains

4 qrs 1 C.

6) 16

qrs. 2—4 remains.

28 lb. 1 qr.

6) 112

Answer,

16 C. 2 qrs. 18 $\frac{4}{8}$ lb.

lb. 18— $\frac{4}{8}$

Here the Integer 20 C. is multiplied by the Numerator 5, and the Product 100 divided by the Denominator 6, and the Remainder 4 is multiplied by the Parts of the next inferior Denomination, &c. and the Answer is 16 C. 2 qrs. 18 lb. $\frac{4}{8}$, or $\frac{2}{4}$ of a Pound Weight, as in the Work.

Addition of Vulgar Fractions.

1. **I**F the Fractions to be added have a common Denominator, add the Numerators together for a Numerator, and place it over the common Denominator.

Example.

Add $\frac{2}{5}$, $\frac{3}{5}$, and $\frac{4}{5}$ of a Pound Sterling together. Say 2 and 3 is 5, and 4 is 9, the Numerator; which place over 5 the common Denominator, thus, $\frac{9}{5}$; and this Improper Fraction $\frac{9}{5}$ is in Value 36 s. for 9 times

4 s.

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4 s. (the 5th of a Pound) is 36 s. thus ; $5 \overline{) 9}$
 Here $\frac{4}{5}$ is 16 s. I say the 5's in 9 once, $1 \overline{) 1\frac{4}{5}}$
 and 4 remains, which is $\frac{4}{5}$ of a Pound.

But if the Fractions to be added, have unequal Denominators, then they must be reduced to a common Denominator, by the Rule before shewn, before Addition can be made ; and then proceed as above.

2. When mixt Numbers are to be added, work with the Fractional Parts as before, and carry the Fractional Value to the whole Numbers.

Example.

Add 25 l. $\frac{3}{4}$ to 12 l. $\frac{2}{4}$ thus $25 \frac{3}{4}$
 $12 \frac{2}{4}$

l. 38 Answer.

Here 1 and 3 the Numerators, make 4 ; and $\frac{4}{4}$ is 1 ; wherefore I carry 1 to the whole Number, saying 1 and 2 is 3, and 5 makes 8 ; and 1 and 2 is 3, and the Answer is 38.

Or they may be reduced to Improper Fractions thus :

$$\begin{array}{r} 25 \frac{3}{4} \\ \hline 103 \\ \hline 4 \end{array} \quad \begin{array}{r} 12 \frac{2}{4} \\ \hline 49 \\ \hline 4 \end{array} \quad \begin{array}{r} 103 \\ \hline 49 \\ \hline 4 \overline{) 152} \\ \hline 38 \text{ Pounds.} \end{array}$$

Here the Numerators are added, and their Total is 152 ; which divided by 4, the common Denominator, quotes 38 Pounds, the same Answer as above.

3. When Compound Fractions are to be added to Simple Ones, reduce the Compound Fraction to a Simple one, as before directed ; and then proceed as above.

Example.

Example.

Add $\frac{2}{5}$ and $\frac{3}{8}$ to $\frac{1}{2}$ of $\frac{2}{4}$ of a Pound; thus, once 2 is 2, and twice 4 is 8, the Compound Fraction: Then add, saying 2 and 3 is 5, and 2 is $\frac{7}{8}$, equal in Value to 17 s. 6 d.

Subtraction of Vulgar Fractions.

In this Rule, the Fractions must have a common Denominator, or be reduced to one, before Deduction can be made.

Example.

What is the Difference between $\frac{3}{4}$ and $\frac{1}{4}$? Answer $\frac{2}{4}$; and proved by Addition: For $\frac{1}{4}$ and $\frac{2}{4}$ makes $\frac{3}{4}$ or 3 quarters.

Note. The Difference between the Numerators is the Difference of the Fractions.

Again, from $\frac{3}{4}$ of a Pound, take $\frac{5}{12}$: Here the Fractions are to be reduced to a common Denominator; 36 the first Numerator, and 20 the second Numerator, and their Difference is 16; and 48 is the common Denominator: So that $\frac{16}{48}$, or $\frac{1}{3}$, in its lowest Terms, is the Difference between $\frac{3}{4}$ of a Pound, and $\frac{5}{12}$ of a Pound; that is, 6 s. 8 d.

To subtract a Compound Fraction from a Simple one.

Rule. Reduce the Compound Fraction to a Simple one, and then work as before.

Example.

From $\frac{1}{4}$ take $\frac{2}{3}$ of $\frac{8}{9}$; say twice 8 is 16, and 3 times 9 is $\frac{16}{9}$, the Compound Fraction: Then $\frac{1}{4}$ and $\frac{16}{9}$ must be reduced to a common Denominator, thus; 13 times 27 is 351, the first Numerator; then 16 times 14 is 224, the second Numerator; and 14 times 27 is 378, the common Denominator. Then subtract
224

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224 the second Numerator, from 351 the first Numerator, and the Remainder is 127, which place over 378 the common Denominator, thus, $\frac{127}{378}$ Answer.

When a Simple Fraction is to be deducted from a whole Number.

Rule. Subtract the Numerator of the Fraction from the Denominator, and place the Remainder over the Denominator, and carry 1 to subtract from the whole Number, &c.

Example.

From 12 l. take $\frac{5}{8}$ thus, say 5 (the Numerator) from 8 (the Denominator) and there remains 3, which place over the Denominator 8, thus, $\frac{3}{8}$; then 1 from 12 and there remains 11: So the Answer is, l. 11 $\frac{3}{8}$ or l. 11—7—5, as may be proved by whole Numbers.

Multiplication of Vulgar Fractions.

Rule. Multiply the Numerators into one another for a Numerator of the Product; and then do the same by the Denominators, for a Denominator of the Product.

Example.

Multiply $\frac{3}{4}$ of a Pound, by $\frac{5}{8}$ of ditto; say 3 times 5 is 15, the Numerator; and 4 times 8 is 32, the Denominator: So the Answer is $\frac{15}{32}$, or in its lowest Terms $\frac{15}{32}$.

You are to note, That Multiplication in Fractions lessens the Product, though in whole Numbers it augments it; as above, $\frac{3}{4}$ or 12 s. 6 d. is less than $\frac{5}{8}$ or 16 s. 8 d. and also less than the other Factor $\frac{3}{4}$ or 15 s. The Reason of which I have not here Room to insist on; but it is given in my *Arithmetick in Multiplication* of

of *Vulgar Fractions*; to which Book I refer the Reader for that, and sundry Enlargements in the several Rules of the Science of *Arithmetick*.

2. To multiply a whole Number by a Fraction.

Rule. Multiply the Integer by the Numerator of the Fraction, and place the Product over the Denominator.

Example.

Multiply 56 l. by $\frac{3}{4}$ 56

3

168

4

} **Facit.**

This Improper Fraction $16\frac{8}{4}$ reduced according to Rule, makes but 42 l. which is less than 56; and confirms what was before asserted, viz. that Multiplication of Fractions lessens the Product, &c.

3. To multiply a Simple by a Compound Fraction.

Rule. Reduce the Compound Fraction to a Simple one, as before taught, and work as above.

Example.

Multiply $\frac{6}{8}$ of a Pound, by $\frac{2}{3}$ of $\frac{3}{4}$ of a Pound: Say 6 times 6 is 36, and 8 times 12 is 96: So that the Answer is $\frac{36}{96}$, or $\frac{3}{8}$ in its lowest Terms; equal to 7 s. 6 d.

Division of Vulgar Fractions.

Rule. Multiply the Numerator of the Divisor into the Denominator of the Dividend, and the Product is the Denominator of the Quotient; and then multiply the Denominator of the Divisor into the Numerator of the Dividend, and the Product will be the Numerator of the Quotient.

Example.

Example.

Divide $\frac{15}{18}$ by $\frac{2}{3}$; $\frac{2}{3}$) $\frac{15}{18}$ ($\frac{45}{32}$ Quotient.

Here 16 multiplied by 2, gives 32; and 15 by 3, gives 45: So that the Quotient is $\frac{45}{32}$, equal to $1\frac{13}{32}$, as in the Work.

Again, Suppose $\frac{24}{36}$ was divided by $\frac{2}{3}$, the Quotient will be $\frac{72}{72}$, equal to 1 Integer, or whole Thing. And so of any other Example.

Reduction of Decimal Fractions.

WHAT a *Decimal Fraction* is, hath been already shewn. The next Step is, how to reduce a *Vulgar Fraction* into a *Decimal*: Which is no more than to annex Cyphers at Discretion (that is, 2, 3, or 4, &c.) to the Numerator, and then divide it by the Denominator.

Example 1.

Reduce $\frac{3}{4}$ of a Pound Sterling to a Decimal:

4) 300
 ————
 75 } that is, 75 Hundredths, equal to 3 qrs.
 } of any thing, whether Money, Weight,
 Measure, &c. as being $\frac{3}{4}$ of 100; and so 25 Hun-
 dredths is, in Decimals, the Quarter of any thing, as
 being $\frac{1}{4}$ of 100; and 5 Five Tenths expresses the half
 of any thing, as being the $\frac{1}{2}$ of 10.

In Reduction of Decimals, sometimes it happens that a Cypher or Cyphers must be placed to the Left-hand of the Decimal, to supply the Defect or Want of Places in the Quotient of Division, or in the Product of Multiplication of Decimals. — In this Case, always remember that so many Cyphers as you annex to the Denominator of the Vulgar Fraction, so many Places you must point off in the Quotient towards the Left-hand; but if there be not so many Places to point off,

off, then you must supply the Defect by placing 0 to the Left of the Decimal.

Example 2.

Reduce 9d. or $\frac{9}{4}$ to the Decimal of a Pound Ster-
ling, thus :

24 | 0) 9000 | 0 (60375

72.

180

168

120

120

(c)

Here is but three Places in the Quotient, *viz.* 375; and therefore I cannot point off 4 for the four Cyphers annexed to 9; wherefore I prefix 0 to the Left of the Quotient 375, thus; 0375, and then it is the Decimal of 375 Ten thousand Parts of an Integer, as in the Work.

The more Cyphers you annex, the nearer you bring your Decimal to the Truth : But in most Cases, four Cyphers annexed is sufficient. But when you are to reduce $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$ (as above) of an Integer to a Decimal, or any Number of Shillings to the Decimal of a Pound, two Cyphers are sufficient. One Example more.

Example 3.

Reduce 3 Farthings to the Decimal of a Pound, that is, $\frac{3}{960}$ vulgarly, 960 Farthings being a Pound, and therefore so express'd, and with the same Reason as 9 Pence before, 240 Pence being a Pound.

96|0) 30000|0 (,003125 The Work being performed according to Division, with two Cyphers prefixed, quotes ,003125, or 3125 Hundred thousand Parts of a Pound.—By the same Method, the Vulgar Fractions of Weight, Measure, &c. are reduced to Decimals.

Example 4.

How is 12 Pounds Weight expressed in the Decimal of

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of 1 C. weight *Avoirdupois*, or 112 lb. the Vulgar Fraction is $\frac{112}{112}$, and the Decimal, 1071 found as before, thus, 112) 120000 (,1071.

112

8cc.

The Remainder 48 is not worth Notice, being less than the 10000th part of Unity, or 1.

Example 5.

How is 73 Days brought to the Decimal of a Year? vulgarly thus expressed $\frac{73}{365}$.

$\begin{array}{r} 365 \overline{) 730} \text{ (2 Ans. 2 tenths.} \\ \underline{730} \\ 0 \end{array}$	$\begin{array}{r} 36,5 \\ \text{Thus proved, } 36,5 \\ \hline 73 \end{array}$
---	---

Here 365, the Days in a Year, is divided by 10, twice; and the Quotients added together, and they make 73 Days.

Valuation of Decimals.

TO find the Value of a Decimal Fraction, whether of Coin, Weight, Measure, &c.

Rule. Multiply the Decimal given by the Units contained in one of the next inferior Denomination, and point off as many Places from the Right-hand as you have in your Decimal; so those Figures toward the Left of those pointed off, are Integers, or Whole Numbers; and those on the other Side toward the Right-hand, are Parts of 1 or Unity; that is, so many Tenths, Hundredths, Thousandths, or Ten Thousandths of One of those Integers, whether a Pound, a Shilling, or a Penny, &c. or of a Tun, a Hundred, a Quarter, or a Pound Weight, &c. And so of any other Integer, of what Kind or Quality soever.

Examples.

Examples.

5476 Parts of a Pound Sterling.

20 Shillings a pound.

9,520

12 pence 1 shilling.

Answer.

6,140

9s. 6d. 960 parts

4 Farthings 1 penny.

or $\frac{1}{4}$ of a d.

960 parts of a l. or almost $\frac{1}{4}$ of a d.

5476 parts of a Tun wt.

20 C. 1 Tun.

9,520

4 qrs. 1 C.

2,080

Answer,

28 lb. 1 qr. of a C,

5 C. 2 qrs. 2 lb. 240 parts.

2,240

In the Example of Money, I multiply the Fraction by 20, and point off 520 for the three places in the Decimal, &c. and the Answer is 9 s. 6 d. $\frac{1}{4}$.

In the Example of Weight, I proceed as in that of Money, (the Fraction being the same) but with different Respect to the inferior Denominations; and the Answer is 9 C. 2 qrs. 2 lb. $\frac{240}{10000}$ of a pound wt.

To find the Value of a Decimal of Money in a briefer Method, viz.

Rule. Always account the double of the first Figure (to the Left-hand) for Shillings; and if the next to it is 5, reckon 1 Shilling; and whatever is above 5,

K

call

call every One, Ten; and the next Figure so many Ones as it contains; which Tens and Ones, call Farthings; and for every 25, abate one: As admit the last Example of Money, viz. 476; the double of 4 is 8; and there being one five in 7, (the next Figure) I reckon 1 s. more, which make 9 s. and there being 2 in 7 above 5, they are to be accounted two Tens or 20; which, with the next Figure 6 being so many Ones, make 26 Farthings; and abating 1 for 25, give 6 d. and almost a Farthing more, for the Fraction, 960 Thousandths of a Pound is within 40 of a Farthing.

Addition of Decimals

Is the same in Practice as in whole Numbers; only in setting down, care must be taken that the Decimal Parts stand respectively under their Parts; that is, Primes under Primes, Seconds under Seconds, Thirds under Thirds, &c. and the Integers to stand as in whole Numbers.

Examples.

Integers	Primes	Seconds	Thirds	Parts	Primes	Seconds	Thirds	Fourths	Fifths
2	4	6	3	4	7	9	6	2	
7	4	3	4	2	3	0	6	4	2
	9	0	6	0	7	6	0	0	6
6	3	7	9	0	0	0	4	7	
4	2	0	0	5	5			9	
4	3	7	7	0	5	1	4	9	8

Note, There must be as many places pointed off, as there are in the biggest Number.

The

The Casting up of the foregoing Examples is the same with Addition of one Denomination in Whole Numbers: The Total of the First (supposing them Pounds Sterling) is 437 l. and 5705 parts. The Second is 1 l. and 54760 parts. And the Third is 2 l. and 14982 parts.

Subtraction of Decimals.

The Numbers must be placed as before in Addition, and then proceed as in Subtraction of one Denomination of Whole Numbers.

Examples.

l. pts.

46,51
9,24

37,27

l. pts.

140,42
91,7462

48,6738

l. pts.

4762,0
0,472

4761,528

Multiplication of Decimals.

Here the placing the Numbers and Operation is the very same as in Whole Numbers; and only to remember to point off towards the Right-hand so many Places for Decimals as you have Decimal Places in both *Multiplicand* and *Multiplier*.

Examples.

(1)

24,6
2,5

1230

492

61,50

(2)

4602
5075

23010

32214

345,150

(3)

52796
26

16776

5592

7,2696

K 2

(4)

(4)	(5)	(6)
<u>507214</u>	<u>5083</u>	<u>425</u>
5006	16	109
500043284	498	3825
	083	4250
	501328	46325

Note, That where there are not a competent Number of Figures, are Places to point off, such Defect is supplied with Cyphers to the Left-hand ; as in the 4th and 5th Examples, according to what was before hinted in reducing a Vulgar Fraction to a Decimal.

Division of Decimals

Is the same in Operation as in Whole Numbers : The only Difficulty is to know how many Decimal Places to point off toward the Right-hand of the Quotient ; to which end remember this Rule : Observe how many Decimal Places there are, both in the Divisor and Dividend, and note the Difference ; and whatsoever it is, so many Places must be pointed off to the Right-hand of the Quotient.

Examples.

Divide 12,345670 by 6,789) 12,345670 (1,818
6789...

In this Example the Dividend hath three Decimal Places more than the Divisor, wherefore I point off 3 Places to the Right-hand of the Quotient, viz. 818 ; so the Quotient is an Integer, and 818 parts.

<u>55566</u>
54312
<u>12547</u>
6789
<u>57580</u>
54312
<u>3268</u>

Divide

Divide 3,46000 by 1,23) 3,46000 (2,813
246 ...

Here the Difference between the Divisor and Dividend is three Places, as in the foregoing Example; therefore ,813 is pointed off for the Decimal Fraction; and the Quotient is 2 Integers, and ,813 thousandths of an Integer or 1.

1000
984
160
123
370
369
(1)

Thus much for Fractions Vulgar and Decimal; wherein I have been as concise as possible, and worked with as much Plainness as I could invent.

BOOK-KEEPING.

The next Qualification to fit a Man for Business, after *Arithmetick*, is the Art of *Book-keeping*, or Merchants Accompts, after the *Italian* Manner, by way of Double Entry.

It is not without good Reason that most People of Business and Ingenuity, are desirous to be Masters of this Art: For if we consider the Satisfaction that naturally ariseth from an Account well kept; the Pleasure that accrues to a Person by seeing what he gains by each Species of Goods he deals in, and his whole Profit by a Year's Trade; and thereby also, to know the true State of his Affairs and Circumstances; so that he may, according to Discretion, retrench or enlarge his Expences, &c. as he shall think fit.

This Art of *Book-keeping*, or *Merchants-Accompts*, is talked of by many, but truly understood but by very few: For every petty School-Master in any By-Corner, will be sure to have *Merchants-Accompts* expressed on his Sign, as a principal Article of his Ability in Teaching; though strictly speaking, for want of the Practical Part, knows hardly any thing of the Matter, and consequently incapable of Teaching it.

Instructions, Notes, Rules, and Directions for the right ordering and keeping *Merchants Accompts*, by the excellent Order of Charge and Discharge, commonly called Debtor and Creditor.

Of the Books in Use.

THE Books of principal Use, are the *Waste-Book*, (or by some called the *Memorial Journal*, and *Leidger*.

Waste-Book.

IN this Book must be daily written whatever occurs in the Way of Trade; as Buying, Selling, Receiving, Delivering, Bargaining, Shipping, &c. without Omission of any one Thing, either Bought or Sold, &c. as Money Lent, or Received at Interest: But not Money Received or Paid for Goods Sold or Bought at Time; for that will come of Course, and must be entered into the *Cash-Book*, from whence it is posted into the *Leidger*.

The *Waste-Book* is rul'd with one Marginal Line, and three Lines for Pounds, Shillings, and Pence; and the
Day

Day of the Month, and Year of our Lord, is inserted in the Middle of the Page. In this Book any one may write, and, on occasion, any thing may be altered or blotted out, if not well entered, or any Error be made.

Journal.

INto this Book every Thing is posted out of the *Waste-Book*, but in other Terms, in a better Stile, and in a fairer Hand, without any alteration of Cyphers or Figures; and every Parcel, one after another (promiscuously set) without Intermission; to make the Book, or several Entries of it, of more Credit and Validity, in Case of any Law Dispute, or other Controversy that may happen between Merchant and Merchant. In this Book you are to distinguish the Debtor and Creditor, (or in quainter Terms, the *Debit* and *Credit*). And to this Book you must have recourse for the Particulars of an Account, which in the *Leidger* are entered in Gross, that is, in one Line. In this Book also, the Day of the Month must be placed in the middle of the Page; and is Ruled with double Marginal Lines, for References to the *Leidger*; and with three Lines for *l.*, *s.* and *d.* as the *Waste-Book*.

Of the Leidger.

FROM the *Journal* or *Dry Book* (as derived from the *French*) all Matters or Things are posted into the *Leidger*, which by the *Spaniards* are called *El libro Grande*, as being the biggest Book, or chief of Accounts. The Left-hand side of this Book is the *Debtor*, and the Right the *Creditor*; and the *Numbers* and *Folios* of each side must be alike, as 45 *Debtor*, and also 45 *Creditor*. The Day of the Month (in this Book) by most is set in a narrow Column on the Left-hand, and

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the Month on the Left of that: But where I kept Books, the Number in the narrow Column referred to the Journal Page, and the Month and Day was placed in the broad Column, to the Right of that; and at the Head of each Folio is the Name of the Place of Residence, and the Year of our Lord; as thus:

London, Anno ————— 1733.

But the Examples of these several Books hereafter following, will make the foregoing Hints of them much more intelligible. ——— And as I am upon the Doctrine of Book-keeping, I'll take this as a universal Text, (for so it is) *viz.*

All Things Received, or the Receiver, are Debtors to the Delivered, or the Deliverer.

Waste-Book Entry.

<i>London, January 1, 1733.</i>			<i>l.</i>	<i>s.</i>	<i>d.</i>
Bought of William Wilkins of Norton					
Falgate, 120 Yards of white Sarcener,					
at 2 s. 3 d. per Yard. ———			13	10	—
To pay in 2 Months.					

The Journal Entry of the same.

1	Wrought Silks Debtor to William Wilkins				
2	l. 13—10 for 120 yds of white Sarcener,				
	at 2 s. 3 d. per yard, to pay in 2 Months ———				
			13	10	—

In this Example, the Account of Wrought Silks is the Receiver, and therefore Debtor to William Wilkins the Deliverer.

Again;

The Young Man's best Companion.

		l.	s.	d.
Again,				
<i>Waste-Book Entry.</i>				
<i>January 4.</i>				
Sold Henry Hartington 246 lb. nett of Indigo Lahore, at 6 s. 6 d. per lb. to pay at 3 Months		79	19	—
<i>Journal Entry.</i>				
3	Henry Hartington Dr. to Indigo,			
4	for 246 lb. nett, at 6 s. 6 d. per lb. to pay in 3 Months	79	19	—
Once more.				
<i>Waste Book Entry.</i>				
Bought of George Goodinch sen. viz.				
Cheese 430 C. $\frac{1}{2}$ }		l. 502-5		
at 23 s. 4 d. per C. }				
Butter 50 Firkins, qt. nett }		35-0		
2800 lb. at 3 d. per lb. }				
to pay at 6 Months		537	05	—
<i>Journal Entry.</i>				
5	Sundry Accounts Dr. to Geo. Good-			
	inch, l. 537—05 — viz.			
4	Cheese of Cheshire, for }	l. 502-5		
	430 C. $\frac{1}{2}$ at 23 s. 4 d. }			
	per C. }			
5	Butter for 50 Firkins, }	35-0		
	qt. nett 2800 lb. at 3 d. }			
	per lb. }			
		537	05	—
<i>Waste Book.</i>				
Sold James Jenkins — viz.				
White Sarcenet 50 Yds, }		7-10-0		
at 3 s. per yard }				
Indigo Lahore 50 pounds, }		17-10-0		
at 7 s. per pound — }				
K 5		25	—	—

<i>Journal Entry of the last.</i>		<i>l.</i>	<i>s.</i>	<i>d.</i>
6	<i>James Jenkins</i> Dr. to sundry Accounts, <i>viz.</i>			
7	To white Sarcenet for 50 yards, at 3 s. per yard — 1. 7-10-0			
8	To Indigo Lahore for 50 lb. at 7 s. per lb. — 17-10-0			
		25	—	—

From these few Examples of Entry, it may be observed, That an experienced Person in Accounts, and a good Writer, may keep a *Journal* without a *Waste-Book*, or a *Waste-Book* without a *Journal*, since they both import one and the same Thing, though they differ a little in Words, or Expressing: For the Leaves of both are numbered by Pages, or Parcels as some do.

But however, I shall give Methods of keeping each, as far as Room will give me Leave.

(1)
The Waste-Book.

London, January, 1st, ——— 1733.

An Inventory of all my Effects of Money,
Goods, and Debts, belonging to me A. B.
of London, Merchant: — viz.

In Cash, for Trading Occasions	l.	s.	d.
—————	3500,	—	—
In Tobacco 4726 lb. at	}	177,	4, 6
9 d. per lb. ———			
In Broadcloth 6 pieces at	}	15,	—
50 s. per piece ———			
Dowlas 1000 Ells, at 2 s.	}	116,	13, 4
4 d. per Ell ———			
Canary Wines 9 Pipes, at	}	270,	—
30 l. per Pipe ———			
Due to me from Henry	}	60,	—
Bland, per Bond ———			
	4138	17	10

(1)

Journal.

Inventory, &c. as above.

Sundry Accts. Dr. to Stock 4138, 17, 10
viz.

1 Cash for Trading Oc- casions	}	3500,	—
Tobaccoes 4726 lb. at			
9 d. per lb. ———	}	177,	4, 6
1 Broadcloths 6 pieces at			
50 s. per piece ———	}	15,	—
1 Dowlas 1000 Ells, at			
2. 4d. per Ell ———	}	116,	13, 4
1 Canary Wines 9 Pipes,			
at 30 l. per Pipe —	}	270,	—
3 Henry Bland due on Bond			
		60,	—

4138 17 10

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I shall make one Page serve both for Waste-Book and Journal Entries, both to save Room, and also to have both Methods of Entry under Eye, to make them more intelligibly useful to the Reader, he hereby being not obliged to turn over Leaf to see their Difference of Entry.

Waste-Book.

London, January 1st, 1733.

Owing to <i>William Webb</i> , by Note of my Hand —	50	—	—	£	s.	d.
Ditto to <i>Roger Ruff</i> , to Balance his Account —	16	12	4			
Ditto to <i>Henry Hern</i> , due the 4 th of May next —	62	—	—			
				128	12	4

Journal.

1 Stock Debtor to sundry Accounts, l. 128—12—4 — viz.						
3 To <i>William Webb</i> , by Note of my Hand —	50	—	—			
4 To <i>Roger Ruff</i> for Balance of his Account —	16	12	4			
5 To <i>Henry Hern</i> , due the 4 th of May next —	62	—	—			
				128	12	4

Waste-

Waste-Book.

2

London, Febr. 1 d.

1733.

Sold Thomas Townsend ; viz.

246 lb. of Virginia-Cut
Tobacco, at 14d. per lb. } 14 07 —
460 Ells of Dowlas, at }
3 s. per Ell — } 69 — —

83 07 —

Feb. 2.

Journal.

6 Thomas Townsend Debtor to Sundries,
viz.

1 To Tobacco for 246 lb. } 14 07 —
at 14 d. per lb. — }
1 To Dowlas for 460 Ells } 69 — —
at 3 s. per Ell — }

83 07 —

Waste-Book.

Ditto 24th.

Bought of Leonard Legg, 4 Pipes of
Canary, at 28 lb. per Pipe —
To pay in 6 Months.

112 — —

Ditto 24th.

Journal.

1 Canary Wines Debtor to Leonard
Legg for 4 Pipes, at 28 Pounds
per Pipe —
2 To pay in 6 Months.

112 — —

The

The short Lines ruled against the Journal Entries are, or may be, termed Posting Lines, and the Figure on Top of the Line denotes the Folio of the Leidger where the Debtor is entered; and the Figure under the Line shews the Folio of the Leidger where the Credit is entered; and the other smaller Figures against the sundry Debtors, or sundry Creditors, (whether Goods or Persons) shew also in what Folios of the Leidger they are posted. And the Figures in the narrow Column toward the Left-hand of the Pounds, Shillings, and Pence Lines, direct to the Folio in the Leidger where the Debit or Credit is posted; that is, to the Account of the Goods or of the Person immediately following the Words *To* or *By*; the first being proper to the Left or Debit Side in the Leidger; and the other used alway on the Right or Credit Side of the Folios in the Leidger.

There are several other Books used by Merchants besides those Three before-mentioned; as the *Cash-Book*, which is ruled as the Leidger, and folio'd likewise, wherein all Receipts of Money are entered on the Left-hand Folio, and Payments on the Right; specifying in every Entry, the Day of the Month, (the Year being set on the Top) for what, and for whose Account the Money was received, or paid; and the Total Debit and Credit of each Side, is to be posted into the Leidger, to the Account of Cash therein, in one Line of either Side, viz. *To*, or *By* sundry Accounts, as *per* Cash-Book, Folio, &c. which is to be done once a Month, or at Discretion; and the Particulars of each Side, Article by Article, are to be posted into the Leidger to the proper Accounts unto which they belong; with References in the Cash-Book to the several Folios in Leidger; and carry the Balance over Leaf in the Cash-Book; by which you may know at any time what Cash you have, or ought to have by you.

Another

Another Book, is a Book of Charges of Merchandize, wherein is to be entered the Custom and petty Charges of any Shipp'd Goods; as Porteridge, Wharfage, Warehouse-room, &c. and once a Month is transferred into the Cash Book on the Credit Side, making Reference to the Book of Charges of Merchandize; and likewise the same in the Debtor side of the same Account in Leidger for the Particulars thereof.

The next Book I shall name, is the Invoice Book, or Book of Factories: In this Book is to be copied all Invoices, or Cargozones of Goods ship'd, either for Accounts proper or partable; and also of Goods received from Abroad, which must always be entered on the Left-side, leaving the Right-side Blank; and on the Advice of the Disposal of Goods sent Abroad, and also on the Sale of Goods received from Abroad, enter them on the Blank or Right-side; so that at first View may be seen how the Account stands, &c.

The next a Bill-Book, wherein is entered Bills of Exchange accepted, and when they become due; and when paid, made so in the Margin.

The next is a Book of Household Expences, for the monthly Charge spent in House keeping; likewise Apparel, House-rent, Servants Wages, and Pocket Expences; and this may be monthly summed up, and carried to the Credit of Cash.

Besides the above mentioned, there must be a Book to copy all Letters sent Abroad, or beyond the Seas; wherein the Name of the Person or Persons to whom the Letter is sent, must be written pretty full, for the reader finding the same.

The next is (and what is very necessary) a Receipt Book, wherein is given Receipts for Money paid, and expressed for whose Account or Use, and for what it is received; to which the Receiving Person must set
his

his Name for himself or some other, with the Year and Day of the Month on the Top.

Lastly, A Note or Memorandum Book, to minute down Affairs that occur, for the better help of Memory; and is of great Use where there is Multiplicity of Business.

Having given an Account of the several Books and their Use, the next Thing necessary will be to give some few Rules of Aid, to enable the Book-keeper to make proper Entries, and to distinguish the several Debtors and Creditors, *viz.*

First, For Money received, make Cash Dr. to the Party that paid it [if for his own Account] and the Party Cr.

Secondly, Money paid, make the Receiver Dr. [if for his own Account] and Cash Cr.

Thirdly, Goods bought for ready Money, make the Goods Dr. to Cash, and Cash Cr. by the Goods.

Fourthly, Goods sold for ready Money, just the contrary, *i. e.* Cash Dr. and the Goods Cr.

Fifthly, Goods bought at Time; Goods bought are Dr. to the Seller of them, and the Seller Cr. by the Goods.

Sixthly, Goods sold at Time, just the contrary, *i. e.* the Party that bought them is Dr. to the Goods, and the Goods Cr. by the Party.

Seventhly, Goods bought, part for ready Money, and the rest at Time: First, make the Goods Dr. to the Party for the Whole. Secondly, make the Party Dr. to Cash for the Money paid him in part of those Goods.

Eighthly, Goods sold, part for ready Money, and the rest at Time: First make the Party Dr. to the Goods for the Whole. Secondly, Cash Dr. to the Party received of him in part of those Goods. ———— Or either of these two last Rules may be made Dr. to Sundries;

Sundries ; as Goods bought, Dr. to the selling Man for so much as is left unpaid, and to Cash for so much paid in ready Money : And so on the contrary for Goods sold.

Ninthly, When you pay Money before it is due, and are to have Discount allowed you ; make the Person Dr. to Cash for so much as you pay him, and to Profit and Loss for the Discount ; or make the receiving Man Dr. to Sundries, as before.

Profit and Loss is Dr.

To Cash for what Money you pay and have nothing for it ; as Discount of Money paid you before due, and to Abatement by Composition, Household Expences, &c.

Per Contra Cr.

By Cash for all you receive, and deliver nothing for it ; as Discount for prompt Payment, any Legacy left you, Money received with an Apprentice, and by the Profit of every particular Commodity you deal in, by Ships in Company, by Voyages, &c.

To balance or clear an Account when full written.

1. **F**IRST, if the Dr. Side be more than the Credit, make the Old Account Cr. by the New ; and if the contrary, make the New Account Dr. to the Old : But if the Dr. Side be less than the Credit, then make the Old Account Dr. to the New, and the New Account Cr. by the Old, for such a Rest or Sum as you shall find in the Account.

2. An Account of Company, wherein you have placed more received of another than his Stock ; then add as much on the Debit side as you find on the Credit side ; to the End that, in the new Account, you may have so much Debit as you put in, and so much Credit as you have received.

3. In

3. In Accounts of Merchandize, you must enter the Gain, or Loss, before you make the Old Account Cr. by the New, and the New Dr. to the Old, for the Remainder of Goods unfold.

4. In the Foreign Accounts, which you are to keep with a double Margin, or Column, for Dollars, Crowns, or any Foreign Coins whatsoever, which have been received or paid by Bills of Exchange for Goods sold by Factors or Correspondents, or bought by them for the Account before; here you must first balance the said inward Margin of Dollars, Crowns, &c.

To remove an Account full written to another Folio.

Sum or add up the Dr. and Cr. Sides, and see the Difference, which place to its opposite: As admit the Cr. side exceeds the Dr. then you are to write the Line in the Old Account to balance on the Dr. side, to answer the Line on the Cr. side of the New Account.

How to Balance at the Year's End, and thereby to know the State of your Affairs and Circumstances.

YOU must make an Account of Balance on the next void Leaf or Folio of your Leidger to your other Accounts; but after so done, do not venture to draw out the Account of Balance in the said Folio, till you have made it exact on a Sheet of Paper, Ruled and Titled for that Purpose; because of Mistakes or Errors that may occur or happen in the Course of Balancing your Leidger; which are to be rectified, and will cause Erasurements or Alterations in that Account, which ought to be very fair and exact; and after you have made it to bear in the said Sheet, Copy fair in the said Account of Balance in the Leidger.

The Rules for Balancing are these, viz.

1st, Even your Account of Cash, and bear the Nett Rest to balance Dr.

2^{dly},

2dly, Cast up all your Goods Bought, and those Sold, of what Kind soever, in each Account of Goods; and see whether all Goods Bought, be Sold, or not; and if any remain Unfold, value them as they cost you, or according to the present Market Price, ready Money; and bear the Nett Rest to balance Dr.

3dly, See what your Goods or Wares severally cost, and also how much they were sold for, and bear the Nett Gain or Loss to the Account of Profit and Loss.

4thly, Even all your Drs. and all your Crs. in order as they lie, and bear the Nett Rest of every several Dr. and Cr. to balance.

5thly, Even your Voyages, your Factors Accounts, and Charges of Merchandize, or any other Accounts wherein is either Gain or Loss, and bear the Nett Gain or Loss to the Account of Profit and Loss; and the Goods unfold to balance.

6thly, Even the Account of Profit and Loss, and bear the Nett Rest to Stock or Capital, as an Advance to your Stock or Capital.

7thly, Even your Stock, and bear the Nett Rest to balance Cr.

Then Cast up the Dr. and Cr. sides of your Balance; and if they come out both alike, then are your Accounts well kept; otherwise you must find out your Error by pricking over your Books again, to see whether you have entered every Dr. and Cr. in the Ledger as you ought.

Note, By pricking over the Book is meant, an Examining every Article of the Journal, against the Ledger, and marking it thus, -- or thus +; and upon second Examination thus ‡; and upon a third Examination thus † -- or any other Marks.

Note also, In all Accounts of Goods, you must keep a Column in the Middle of the Leaf, of each side, for Number, Weight, or Measure.

And

And also Note, That the Money, Wares, or Goods remaining in your Hands, and the Debts owing to you, must ever balance with the Nett Stock and Debts owing by you.

Though all that hath been said in relation to Book-keeping, and the several Rules thereunto belonging, may seem a little abstruse to the altogether unlearned therein, yet there is no such mighty Difficulty to obstruct them as they may imagine : For, these following Hints may render what hath been already said, intelligible to an ordinary Capacity.

1st, Stick close to the Text, or General Rule before-mentioned, viz. That all Things Received, or the Receiver, are Debtor to all Things Delivered, or the Deliverer ; for this Rule holds good in all Cases.

2^{dly}, When the Dr. (whether Person or Goods) is known, the Cr. is easily understood, without mentioning it : For if *A* be Dr. to *B*, then *B* is Cr. by *A*, for what Sum soever it be : Also, if Goods be Dr. to *C*, then *C* is Cr. by those Goods, for the Sum they amount to. ——— This I mention, because that in most Authors (if not all) that I have met with on the Subject of Book-keeping, spend a great many Words which I think (begging their Pardon if I err) might be saved, in declaring the Creditor, as well as shewing the Debtor, when it may be understood, as afore-said.

3^{dly}, This Art of *Italian* Book-keeping, is called *Book-keeping by Double Entry*, because there must be two Entries ; the first being a Charging of a Person, Money, or Goods ; and the second, a Discharging of a Person, Money, or Goods.

4^{thly}, *Strictly Note*, That if the First Entry be on the Dr. or Left-hand side of your *Leidger* ; the next, or Second Entry, must always be made on the Right or Credit side, of your *Leidger* : For whenever one Person or Thing is Charged, then always another Person

Person or Thing is Discharged for the said Sum, let it be what it will.

And so it is, in Balancing or Evening an Account, and carrying it to another Folio; for if the Old Account be evened by Balance on the Credit Side, then the New Account must be Debited or Charged on the Debit Side, for the Sum that Balanced the Old Account.

Much more might be said to this *Art of Book-keeping*, if I had Room; but I have plainly spoke to the Principal Fundamentals thereof, which I hope may be sufficient for the Instruction and Improvement of any intelligent Reader.

The next Matter I shall go upon, is to shew, or give Examples of various Kinds of Receipts, and Promissory Notes; also Bills of Parcels in different Trades; likewise Bills of Book Debts, Bills of Exchange, with Remarks on them; and some other Presidents of Writings in Trade, and Mercantile Affairs.

And first of Receipts of different Forms.

R Eceived September 23, 1733, of Mr. <i>Anthony Archer</i>, the Sum of Six Pounds Nine Shillings; I say re- ceived for my Master <i>Bryan Burry</i>, per me	} l. s. d. 6—09—0

Caleb Catchmoney.

R Eceiv'd of Mr. <i>Kendrick Keptouch</i> Ten Pounds Eleven Shillings and Six Pence, in full Payment; per me	} l. s. d. 10—11—6

Henry Hasty.

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Note, The Sum received must always be expressed in Words at Length, and not in Figures, in the Body of the Receipt; but it may and ought to be expressed in Figures behind a Brace, (as in the two foregoing Examples) as well as in the Body of the Receipt.

When a Receipt is given in a Book, there is no Occasion to mention the Man's Name of whom you receive the Money; because that is implied, he being the Owner of the Book.

A Receipt in part of Goods Sold. l. s. d.

R Eceived the 24th of September,
1733, of Mr. Timothy Truflittle, } 50—00—00
Fifty Pounds in part of Indigo sold him
the 22d Instant, per me
Laurence Lovemoney.

A Receipt given in a Receipt Book.

R Eceived the 26th of September,
1733, the Sum of Forty Five } 45—00—00
Pounds by the Order and for the Ac-
count of George Greedy, Esq; per

Timothy Truflly.

R Eceived the 27th of September,
1733, of Mr. Daniel Daven- } 100—00—00
port and Company, One Hundred
Pounds, on Account of Self and Part-
ner; per

James Jenks.

Received

l. s. d.

R Eceived the 28th of September, 1733, of Mr. *Peter Punctual*, Fifty Five Pounds Sixteen Shillings and Nine Pence, in part for Tobacco sold him the 24th of August last past, per *Fabian Funk*. } 55—16—09

R Eceived the 29th of September, 1733, of the Honourable East-India Company, Three Hundred and Fifteen Pounds Ten Shillings, per Order and for the Account of *Peter Pepper*; per *Stephen Storax*. } 315—10—00

R Eceived October 2, 1733, of the Governor and Company of the Bank of England, One Thousand Six Hundred Pounds Ten Shillings, for Self and Company; per *Leonard Longpurse*. } 1600—10—00

R Eceived the 5th of Octob. 1733, of the Worshipful Company of Grocers, Forty Nine Pounds Fifteen Shillings, in full Payment for my Father *Peter Plumb*, per me *Peter Plumb, junior*. } 49—15—00

R Eceived the 6th of Octob. 1733, of the Right Honourable *John Barber, Esq*; Lord-Mayor of London, the Sum of Sixty Pounds, for the Use of the Worshipful Company of Haberdashers; per *Caleb Careful, Clerk*. } 60—00—00

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A Rent Gatherer's Receipt.

l. s. d.

R Eceived the 24th of October,
1733, of Mr. Aaron Arable,
Twenty Five Pounds, in full for half
a Year's Rent, due at Michaelmas last,
and deducted for Taxes Five Pounds,
and for Repairs Two Pounds, toge-
ther Seven Pounds; I say received
for the Use of Laurence Letland, Esq;
by Virtue of his Letter of Attorney,
per
Robert Rentrole.

25—00—00

R Eceived of Mr. Timothy Tennant,
this 25th Day of Octob. 1733,
Six Pounds, for a Quarter's Rent due
at Michaelmas last, for my Master
Lancelot Letfarm; per me

6—00—00

Francis Faithful.

R Eceived August 14, 1733, of
Mr. Peter Bishop, Twenty Nine
Pounds Six Shillings, in part of a Bill
of Sixty Pounds, due the 3d of Xber
next, to Mr. Sampson Shuffle; per
Francis Fiddell.

29—06—00

*A Receipt on the Back of a Bill of
Exchange.*

S eptember 30th, 1733, received
the full Contents of the within-
mentioned, being 500 Pieces of Eight
per

500 pcs of 8

Nathan Needy.

Promissory

Promissory Notes.

I Promise to pay to Mr. *Timothy Teazer*, Sixty Pounds,
on the 20th of this Instant *September*; Witness my
Hand this 15th of *September*, Anno 1733.

Daniel Dilatory.

l. 60—00—00

October 18th, 1733.

I Promise to pay to the Honourable the Directors of
the South Sea Company, or Bearer, on Demand,
Four Hundred and Fifty Pounds, for my Father *James*
Jones.

William Jones.

l. 450

24th of October, 1733.

I Promise to pay unto the Governor and Company
of the Bank of England, Two Thousand Pounds.

Nabum Neednothing.

l. 2000

October 24th, 1733.

I Promise to pay to the *Royal African* Company, or
Bearer, on Demand, Seven Hundred Fifty Six
Pounds Ten Shillings and Nine Pence, for my Ma-
ster, *Robert Regular.*

Lewis Martin.

l. 756—10—9

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I Promise to pay to the Honourable *East-India Com-*
pany, or Bearer, Five Hundred Pounds, for *Henry*
Hudson. *Martin Moneybag.*

26th October, 1733.

l. 500

I Promise to pay to *Mr. Christopher Cash*, Five Pounds
for the Value received: Witness my Hand this 26th
Day of *October*, 1733.

Robinson Ruck.

l. 5—00—00

A Note given by two.

WE, or either of Us, promise to pay to *Mr. Mat-*
thew Mistrust, or his Order, Six Pounds Ster-
ling, on Demand, for the Value received: Witness our
Hands this 27th of *September*, 1733.

Nathan Needy.

Samuel Surety.

l. 6—00—00

Witness, Nicholas Notice.

A Bill of Debt.

MEMORANDUM, That I *William Want*, of
London, Weaver, do owe and am indebted unto
Mr. Timothy Trust of *Westminster*, Watchmaker, the
Sum of Twenty-five Pounds six Shillings, of lawful
Money of *Great Britain*; which Sum I promise to pay
to the said *Timothy Trust*, his Executors, Administra-
tors, or Assigns, on or before the 10th Day of *Decem-*
ber next ensuing: Witness my Hand this 22d Day of
October, 1732.

William Want.

Witness, Titus Testis.

Bills

Bills of Parcels.

IT is usual when Goods are sold, for the Seller to deliver to the Buyer, with the Goods, a Bill of Parcels; which is a Note of their Contents and Prices, with the Total of their Value cast up, &c. — These Bills ought to be handsomely writ, and in methodical Order, according to the best and customary Way of each particular Trade.

I shall therefore shew the Forms of Bills of Parcels in some Trades and Professions, with the shortest Methods of casting up the several Articles in each Bill.

A Mercer's Bill.

London, September 26, 1733.

Bought of *Abel Atlafs*, and *Ben. Burdett*, viz.

- 12 Yds $\frac{3}{4}$ of rich flower'd Sattin, at 12 s. 6 d. per Yd.
 - 8 Yds of sprig'd Tabby, at 6 s. 3 d. per Yd.
 - 5 Yds $\frac{1}{4}$ of Farrindon, at 6 s. 8 d. per Yd.
 - 6 Yds of Mohair, at 4 s. 2 d. per Yd.
 - 17 Yds $\frac{1}{2}$ of Lutestring, at 3 s. 4 d. per Yd.
-

Sometimes the Money is paid presently, then the Receipt is made as follows:

Received the 26th of September, 1733, Sixteen Pounds seven Shillings and eight Pence, in full of this Bill, for my Master *Abel Atlafs*, and Company;
per me

Francis Fairspoken.

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A Woollen-Draper's Bill.

London, September 24, 1733.

Bought of Benjamin Broadcloth, 22d of September 1733, viz.

	s.	d.
7 Yards of fine Spanish Black, at — 18 — 4 per Yd.	18	4
5 Yds $\frac{1}{2}$ of ditto, at — — — 12 — 4 ditto	12	4
6 Yds $\frac{3}{4}$ of fine mixt Cloth, at — 15 — 9 ditto	15	9
16 Yds $\frac{1}{4}$ of Prize, at — — — 3 — 6 ditto	3	6
4 Yds of Drap-de-berry, at — — — 13 — 5 ditto	13	5
5 Yds $\frac{7}{8}$ of superfine Spanish Cloth, at — — — } — 18 — 10 ditto	18	10

A Linnen Draper's Bill.

September 26th, 1733.

Bought of Marmaduke Muslin, viz.

16 Ells of Dowlafs, at 1 s. 4 d. per Ell.	1	4
14 Ells of Lockram, at 1 s. 3 d. per Ell.	1	3
22 Ells $\frac{1}{2}$ of Holland, at 3 s. 4 d. per Ell.	3	4
1 Piece of Cambrick, at 15 s.	15	
85 Yds $\frac{1}{2}$ of Diaper, at 1 s. 10 d. per Yd.	1	10
19 Yds $\frac{3}{4}$ of Damask, at 4 s. 3 d. per Yd.	4	3
2 Pieces of Muslin, at 18 s. 10 d. per Piece.	18	10

The several Articles of these Bills are purposely omitted being cast up, for the Exercise of the Reader, in the Rules of *Practice*; or by the Rules of *Multiplication of Money*, before shewn; which indeed is the best Method of all, for the ready casting up the divers and sundry Articles contained in any Bill of Parcels whatsoever.

Example.

Example. We'll take the last Article of the Woollen Draper's Bill, viz. 5 Yards $\frac{7}{8}$, &c. at 18 s. 10 d. per Yard.

	s.	d.		s.	d.
	18	10		18	10
		5 $\frac{7}{8}$			7
l. 4—14—2			8) 131—10		
16—5 $\frac{3}{4}$					
				16—5 $\frac{3}{4}$	
Facit l. 5—10—7 $\frac{3}{4}$					

In this Example, the Price is multiplied by the Quantity, viz. 5 Yards $\frac{7}{8}$, according to the Rules delivered in *Multiplication of Money*; and the Product by 5 is l. 4—14—2: Then for the $\frac{7}{8}$ of a Yard, I multiply the Price of the Integer, viz. 18 s. 10 d. by the Numerator of the Fraction, viz. 7, and divide by the Denominator 8, and the Quotient is 16 s. 5 d. $\frac{3}{4}$, agreeable with the Rule spoke to in the Doctrine of Fractions — Which 16 s. 5 d. $\frac{3}{4}$ added to the Product of 18 s. 10 d. multiplied by 5, gives l. 5—10—7 $\frac{3}{4}$, as in the Operation above.

A Grocer's Bill.

Bought of Robert Raisin and Peter Plumb, October the 4th, 1733, viz.

	C.	qrs.	lb.		l.	s.	d.
Sugar 2 Hhds qr.	17	2	17	at	1	10	6 per C. £
Raisins 3 Barrels	6	1	19	at	1	14	5
Tobacco 1 Hhd	4	0	12	at	4	19	4
Rice 1 Barrel	1	0	15	at	2	16	4
Pepper 1 Bag	1	3	19	at	3	12	4
Brimstone	2	1	19	at	1	19	1

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A Hosiery's Bill.

Bought of *Silvester Slipstocking*, Octob. 5th, 1733, viz.

5 Pair of Womens mixt Worsted Hose, at	5 s. 7 d.
3 pr of Womens Silk Hose, at	9 s. 4 d.
22 pr of Men's Woollen ditto, at	3 s. 2 d.
8 pr of Womens ditto, at	2 s. 9 d.
21 Yds of Flannel, at	1 s. 11 d.
8 pr of Thread Hose, at	3 s. 4 d.

The best and most expeditious Way of casting up these several Articles is by the Methods shewn in *Multiplication of Money*.

A Fishmonger's Bill.

Bought of *Leonard Ling*, 6th of October, 1733:

3 C. of Haberdine, at	1. 7—10—6	per C. £.
1 C. $\frac{1}{2}$ of Ling, at	8—12—6	
4 C. $\frac{1}{2}$ of Stock Fish, at	4—10—5	
6 Barrels and $\frac{1}{2}$ of wh. Herrings	3—10—2	
1 Barrel of red Herrings	2—12—6	
95 dried Salmon, at	0—01—2	

The Amount of each Article is purposely omitted for the young Man's Exercise in *Arithmetick*.

Note, *Haberdine or Ling*, 124 is a Hundred: *Stock Fish and Herrings*, 120 to the Hundred, 1200 to a Thousand, and 12 Barrels a Last.

A Leatherfeller's Bill.

Bought of *Henry Hide*, the 7th of October, 1733, viz.

15 Large oil'd Lambs Skins, at	1—3	$\frac{2}{3}$ per Skin £
13 Kipp of Goat Skins, at	3—4	
137 Allom'd Sheep Skins, at	1—3	
19 Calve Skins, at	4—3	
15 Oil'd Buck Skins, at	12—9	
8 Russia Hides, at	12—9	
16 Dicker of Hides, at L.	15—11—5	

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Note, 50 Goat Skins makes a Kipp; and other Skins,
5 Score to the Hundred. A Dicker is 10 Hides or Skins;
and 20 Dicker a Last.

A Pewterer's Bill.

Bought of Andrew Antimony, October the 7th, 1733.					
viz.	lb.	d.	l.	s.	d.
9 Hard Metal Dishes wt. 42 at 14 per lb.—	2	9	7		
1 Dozen of ditto Plates —————	0	17			
1 Chamber Pot of ditto —————	0	4			
1 Standish of ditto —————	0	4			
2 Tankards of ditto —————	0	5	10		
18 Best Spoons —————	0	4	6		
3 Hard Metal Porringers —————	0	3			
1 Salt of ditto —————	0	1	10		
1 Set of Castors —————	0	10			
			4	19	2

42 lb. of Pewter, at 1 2 7

Examples of casting.

22 pr of Woollen Hose, at 3 s. 2 d. per pr. 8 2
7 and 3 6

1—2—2 Answer l. 2 9 0

3—6—6

3—2 the odd pair.

Answer l. 3—9—8

*Bills on Books Debts.**A Woollen Draper's Bill.*

Mr. Francis Frieze, Dr.

s. d.

1733			
April	20	To 16 Yds $\frac{3}{4}$ of Black Cloth, at ————	18 3 per Yd. £
ditto	24	To 4 Yds $\frac{1}{8}$ of Drap-de-berry, at ————	15 6
May	4	To 35 Yds of mixt Grey Cloth, at ————	10 5
	17	To 9 Yds of fine dit. at ————	17 3
June	12	To 12 Yds $\frac{1}{2}$ of fine Broad, at ————	17 3

If the Gentleman pays the whole Bill, then make the Receipt thus :

Received the 19th of Octob. 1733,
of Mr. Francis Frieze, the Sum of } 1.
Fifty Four Pounds, &c. in full of } 54, &c.
this Bill, and of all Accounts, for my
Master, David Draper ; per
Michael Measurewell.

A Mercer's Bill.

1733		Madam Dinah Dilatory, Dr. to Bryan Brocade, viz.	
		Yds	s. d.
Mar.	16	To 16 $\frac{1}{2}$ of flower'd Sattin, at 14 9 p. yd.	
April	14	To 14 of Venetian Silk, at ————	11 8
ditto	16	To 99 of Mohair, at ————	6 3
May	16	To 14 $\frac{1}{2}$ of flower'd Damask, at 9 7	
June	7	To 5 $\frac{1}{8}$ of Genoa Velvet, at ————	21 6
ditto	25	To $\frac{3}{4}$ of Lutestring, at ————	4 7

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If Part of the Bill is paid, write thus :

Received of Madam Dinah Dilatory,
Twelve Pounds Ten Shillings in part of } l. s. d.
Payment, for my Master Bryan Brocade ; } 12 10 00
per

Henry Hunter.

A Tobacconist's Bill.

1733		Mr. Francis Fumo, Dr. to Richard Raife.
		cloude, viz. d.
May	1	To 1 Hhd of Tobacco, qt.
		nett 569 lb. at ————— 10 $\frac{1}{2}$ per lb.
ditto	25	To 1 Box, qt. 75 lb. $\frac{1}{2}$ nett, at 11 $\frac{3}{4}$
June	4	To 5 Bags of Old Spanish,
		qt. nett 671 lb. at ————— 3 $\frac{1}{4}$
July	12	To $\frac{1}{2}$ Hhd, qt. 334 Gross,
		Tare 42, nett 293 lb. at — 5 $\frac{1}{4}$
7ber	7	To 2 Roles of Tobacco,
		qt. 94 lb. at ————— 9 $\frac{1}{8}$

A Cornchandler's Bill.

1733		Mr. Robert Racer, Dr. to Lionel Livery.
		s. d.
April	24	To 5 Quarters of Oats, at — 2 3 p. Bu.
May	16	To 9 Bushels of Beans, at — 4 10
June	19	To 7 Bushels of Bran, at — 1 10
		To 19 Bushels of Oats, at — 1 11
ditto	24	To 16 Bushels of Beans, at 3 11

A Stationer's Bill.

1733		Mr. Siscera Scribler, Dr. to Phineas Foolscap, viz.	
		Reams	s. d.
July	12	To 75 of Demy Paper, at —5	9 p. R. 6.
ditto	31	To 195 of 2d Foolscap, at —6	3
Aug.	24	To 375 of 2d Demy, at —8	2
7ber	6	To 95 of French Royal, at —9	6
8ber	26	To 26 Rolls Parchment, at 15	11
		l. 331-18-5.	

Note, *A Roll of Parchment is 60 Skins :-
A Ream of Paper 20 Quires; and a Bale of
Paper 10 Reams.*

A Bricklayer's Bill.

1733		Mr. Martin Messuage, Dr. to Peter Pan- tile, viz.	
Mar.	27	To 25 Thousand of Bricks, at 16 s. p. M.	
ditto	30	To 11 Thous. Plain Tiles, at 20 s. 6d. p. M.	
April	1	To 28 C. of Lime, at 12 s. per C.	
ditto	9	To 20 Load of Sand, at 3 s. 6 d. p. Load.	
May	20	To 140 Ridge Tiles, at 8 s. 6 d. per C.	
June	24	To 90 Days Work my self, at 3 s. p. Day.	
		To 90 Days my Man, at 2 s. 6 d.	
		To 90 Days another Bricklayer, at 2 s. 6d.	
		To 90 Days for 2 Labourers, at 20 d. a Day each.	

Note, 1000 plain Tiles is 1 Load; and 25 Bags or
Bushels of Lime 1 C. A Brick must be 9 Inches Long,
and

and 4 Inches $\frac{1}{2}$ Broad. Bricks are of Three Sorts, viz. Plaise Bricks, Red and Grey Stock Bricks.—

Here it is necessary to give a General Rule for the casting up any Things sold by the Thousand; as Bricks, Tiles, Clinkards, or Flanders paving Bricks, and several other Things mentioned in the Book of Rates, viz. Barrel Hoops, Goose Quills, Oranges and Lemons, Squirrel Skins, Billets, &c.

And the easy Rule is this, viz.

Multiply the given Number by the Shillings in the Price, (if the Price be at so many Shillings per M.) and always cut off three Figures or Places toward the Right-hand; and the Figures toward the Left-hand are Shillings, which divide by 20 to bring them into Pounds: And those Figures separated toward the Right-hand, multiply by 12, the next inferior Denomination; and still cut off, or separate three Places toward the Right-hand, and the Figures toward the Left are Pence; and the three last Figures cut off, multiply by 4; and still separate three Places toward the Right-hand, and the Figures toward the Left are Farthings. — And if the Price be Shillings and Pence per Thousand, then reduce the Price into Pence, and multiply the given Number by the Pence contained in the Price, cutting off three Places toward the Right, as aforesaid; and the Figures toward the Left are Pence, which bring into Pounds according to Rule; and multiply the Remainder, or Figures cut off, by 4, &c.

Examples

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Examples.

24650 Bricks, at 17 s. per Thousand.

17

172550

24650

Shillings 41,91050

or l. 20,19¹/₈¹/₂

Answer.

20 l. 19 s. & $\frac{600}{10000}$ of a shilling.

261324 plain Tiles, at 16 s. 6 d.

198

12

2090592

198 d.

2351916

261324

Pence 51742,152

Divide per 12) 4

20) s. 431,1—10 d. | 608

l. 215—11—10 & $\frac{608}{10000}$ of a penny.

When Things bought by the Thousand, and Retail-
ed by the Hundred, as particularly *Dutch* and *English*
Pantiles; then follow this Rule, *viz.*

Multiply the given Quantity by the Price, whether
Shillings, or Shillings and Pence. If Shillings, mul-
tiply by the Number of Shillings, and cut off two
Figures or Places toward the Right-hand; and those
toward the Left are Shillings; which reduce to
Pounds as usual; and what remains, that is, the Fi-
gures cut off, multiply by 12; and again cut off two
Places

Places more toward the Right-hand, and the Figures to the Left are Pence ; and what remains multiply by 4, &c.

Example.

1726 Pantiles, at 7 s. per C.

$$\begin{array}{r}
 7 \\
 \hline
 120 \overline{) 82} \\
 \underline{12} \\
 9 \overline{) 80} \\
 \underline{4} \\
 3 \overline{) 36}
 \end{array}
 \left. \vphantom{\begin{array}{r} 120 \overline{) 82} \\ 12 \\ 9 \overline{) 80} \\ 4 \\ 3 \overline{) 36} \end{array}} \right\} \text{That is, } 6 \text{ l. } 00 \text{ s. } 9 \text{ d. } \frac{3}{4} \text{ and } \frac{36}{1000} \text{ of a Farthing.}$$

If the Price be Shillings and Pence, multiply by the Pence contained in the Price, and proceed as before ; and then the Figures toward the Left-hand will be Pence ; which reduce to Pounds according to Rule.

Example.

2964 Stock Bricks, at 2 s. 6 d. per C.
30 Pence.

$$\begin{array}{r}
 \text{Pence } 889 \overline{) 20} \\
 \underline{4} \\
 80
 \end{array}
 \left. \vphantom{\begin{array}{r} 889 \overline{) 20} \\ 4 \\ 80 \end{array}} \right\} \text{That is, } 3 \text{ l. } 14 \text{ s. } 1 \text{ d. and } \frac{80}{1000} \text{ of a Farthing, or } \frac{20}{1000} \text{ of a Penny.}$$

This Method is preferable to *Practice*, because of its Exactness for the odd Number above Thousands or Hundreds, which would be puzzling to be very exact as to the odd Number ; but by this Method, the Question is solved to the 1000 or 100 parts of a Farthing ; as may be seen by the foregoing Examples of Operation.

of

Of Bills of Exchange.

BILLS of Exchange are either Inland, or Foreign: The Inland Bills are drawn by one Trader in one City or Town, upon another of another City or Town in the same Kingdom; as *London* upon *Bristol*, or *Exeter* upon *London*, &c. and these chiefly concern our Shop-keepers, and Wholesale Traders either of Town or Country; and the Foreign more immediately concern the Merchant.

Bills of Exchange, if handsomely drawn, must be written in a fair Hand, on a long piece of Paper, about three Inches broad; and writ in Form after the following Precedents.

A Bill Payable at Sight.

London, 6th October, 1733.

AT Sight hereof, pay to Mr. *Gregory Greedy*, or his Order, the Sum of Fifty Pounds, for Value received of *Christopher Cash*; and place it to Account, as per Advice of

Your humble Servant,

Daniel Drawbill.

To Mr. Peter Punctual,
Grocer, in High-street
in Bristol.

Note, A Bill at Sight is payable three Days after the Acceptor seeth it.

Exon, November 4th, 1733.

SEven Days after Sight hereof, pay to Mr. *Nathan Needy*, or his Order, Twenty-four Pounds Ten Shillings, for the Value received here of Mr. *Timothy Transfer*; and place it to Account, as per Advice from

Your Friend and Servant,

Michael Moneyman.

To Mr. Simon Certain,
Haberdasher, in Milk-
street, London.

If Mr. Needy sends his Servant *Andrew Benson*, to receive the Money; after he hath writ his Name on the Back of the Bill, (which is his Order) the Servant must write a Receipt to his Master's Name, thus:

REceived November 16, 1733, the full Contents of the within-mentioned Bill, being Twenty-four Pounds, Ten Shillings.

Witness,

Nathan Needy.

Andrew Benson.

A Foreign Bill of Exchange.

London, 6th, October, 1732, for 460 Crowns, at
56 d. $\frac{2}{3}$ Sterling per Crown.

AT Usance pay this my first Bill by Exchange (my second or third not being paid) unto Mr. *Henry Vernon*, or Order, Four hundred and sixty Crowns, at 56 d. $\frac{2}{3}$ per Crown, for the Value received of Mr. *Samuel Thompson*, and pass it to Account, as per Advice from, Sir,

Your humble Servant,

To Mr. Will. Walker,
Merchant in Paris.

Ebenezer Reynolds.

Another.

London, 17th October, 1733, for 480 Dollars, at
55 d. $\frac{1}{2}$ per Dollar.

AT Three Usance pay this my First per Exchange, unto Mr. *William Wealthy*, or Order, Four Hundred and Eighty Dollars, at 55 d. $\frac{1}{2}$ Sterling per Dollar, for the Value received of himself, and place it to Account, as per Advice from

Your humble Servant,

To Messrs Daniel and
David Barnardiston,
Merchants in Aleppo.

Mark Mercator.

Note,

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Note, USANCE in England, is a Calendar Month;
and Double Usance Two Months, &c.

Once more.

Bristol, 8 October, 1733, for 600 Pieces of Eight, at
53 d. $\frac{2}{3}$ per Piece.

AT double Usance pay this my First Bill of Ex-
change unto Mr. Lawrence da Luz, or his Or-
der, six Hundred Pieces of Eight Mexico, at Fifty-three
Pence $\frac{2}{3}$ Sterling per Piece of Eight, for Value received
of Gomez Henriquez, and pass it to Account, as per
Advice from yours,

William Henry Hern.

To Mr. Simon Surepay,
Merchant in Legborn.

Notes on Bills of Exchange.

1. The Acceptor of any Bill is become absolute Dr. to
the Person to whom the Bill is payable for the Contents
thereof.

2. The Person to whom the Bill is payable, must de-
mand the Money the very Day it becomes due; and if the
Acceptor die before it becomes due, it must be demanded
of the Executor or Administrator.

3. The Drawer of any Bill, must always give his Cor-
respondent a Letter of Advice; That he hath drawn such a
Bill on him for such a Sum, &c.

4. None may pay a Bill without such a Letter of Ad-
vice.

5. A Bill is due the third Day after the Expiration of
the Time mentioned in the Bill.

Of Endorsing.

It frequently happens, that between the Acceptance
of a Bill, and the Time of Payment, the Party to
whom

whom it is first made payable, hath occasion to pay it away; if so, he writes his Name on the Back of the Bill, which is his Order, (as said before) and gives it to the Person he is indebted to, and then he is impowered to receive the Money; and it may be, the second Person also wants to pay it away; and then he writes his Name likewise under the other, and delivers it to a third Person to receive the Money; and it may be, the third does the same, and delivers it to a fourth Person, &c. All that do so, are Endorsers; and he that last hath the Bill, if the Acceptor will not pay it, may sue him, or the Endorsers, or Drawer, or any of them, for the Money.

An Endorsement is generally in these Words, viz.
Pay the Content of the within-mentioned Bill to Henry Hasty.

George Greedy.

But many times the Name only is accounted sufficient.

Of Protesting.

When a Bill is to be *Protested*, the Party that hath the Bill must go to a *Publick Notary*, (not a common *Scrivener*) whose Business it is; and he goes with you to the Acceptor's House, and demands Payment, &c. and then he draws up a *Protest* according to Law; which is to be returned to the Drawer within the Time limited, &c.

It is needless to give here the Form of a *Protest*, because no Man can do it of himself.

A Bill of Debt.

K Now all Men by these Presents, That I Lawrence Lackcash, of Southwark, Vintner, do owe and am indebted unto Charles Creditman of the same Place,
Salter,

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Salter, the Sum of One Hundred and Fifty Pounds, of Lawful Money of Great Britain; which said Sum I promise to pay unto the said Charles Creditman, his Executors, Administrators, or Assigns, on or before the 24th of December next ensuing the Date hereof. Witness my Hand and Seal this 6th Day of October, 1733.

Sealed and Delivered
in the Presence of

Lawrence Lackcash.

A Bill for Money borrowed.

Recieved and Borrowed of Oliver Overcash of London, Merchant, Fifty Pounds, which I do hereby promise to pay at Demand. Witness my Hand this 6th Day of October, 1733.

Peter Penury.

l. 50

The Charge of Noting and Protesting a Bill.

			<i>s. d.</i>				<i>s. d.</i>
Noting,	{	within the City	1-6	Pro-	{	within	3-0
		without the City	2-6			testing	without

The Form of a Bill of Lading.

Shipped by the Grace of God, in good Order and well Conditioned, by (Edward Export of London, Merchant) in and upon the good Ship called (the Bilboa Merchant of London) whereof is Master under God for this present Voyage (Martin Mizen of London, Mariner) and now riding at Anchor in (the Port of London) and by God's Grace bound for (Cadiz) to say (1 Bale of Book-TB ing Baize, and 1 Trunk containing Five Hundred No. Pair of silk Stockings; Contents, &c. as per In-1,2. voice) being Mark'd and Number'd as per Margin,

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gin, and are to be delivered in the like good Order at the aforefaid Port of (*Cadiz*) the Danger of the Seas only excepted, unto (*Mr. Thomas Drake*, Merchant, there) or to his Assigns, he or they paying Freight for the faid Goods, (Three Pieces of Eight *per C.* wt.) with Primage and Average accustomed. In Witness whereof the Master or Purser of the faid Ship hath affirmed to (Three) Bills of Lading all of this Tenor and Date, one of which (Three) Bills being accomplished, the other (Two) to stand void. And so God send the good Ship to her desir'd Port in safety. *Amen.*

Dated in London, the 6th of October, 1733. Inlides and Contents unknown to.

Martin Mizzen.

Note, The several Words included in the Parenthesis; are to be put into the several vacant Places that are in a Blank Bill of Lading.

Note also, AVERAGE is sometimes the general Allowance made to the Master of the Ship, of 1 d. or 2 d. in every Shilling Freight. PRIMAGE, a small Allowance to be distributed among the Sailors.

The Forms of an Invoice.

Port Royal in Jamaica, July 24. Anno 1733.

INVOICE of Five Barrels of Indigo, Five Hhds of Sugar, and Five Hhds of Pymento, shipped on board the *George* of London, *George Jones* Commander, for Account and Risque of Messrs *John* and *Thomas Fisher* of London, Merchants, being marked and number'd, as per Margent; Costs, Coft and Charges, as in the following Example, viz.

Indigo.

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IF	Indigo 5 Barrels				
	142 lb.				
	143				
No.	146				
145	152				
	173				
		756 lb. nett, at 2 s. 2 d. per lb. —	81	18	—
	Sugar 5				
	Hhds Tare				
	C. qr. lb. C. qr. lb.	C. qr. lb.			
	11-3-27—1-2-19	Gross 68-0 00			
	12-2-19—1-3-00	Tare 8-3-12			
	13-2-13—1-2-16				
145	14-1-15—1-3-11	Nett 59-0-16 at 24	70	19	5
	15-1-10—1-3-22	p. C.			
		68-0-00—8-3-12			
	Pimento	lb.			
	5 Hhds Tare	2026 Gross.			
	lb. lb.	389 Tare.			
	432—84				
	396—72	Nett 1637 at 11 d. $\frac{1}{2}$ p. lb	76	14	8 $\frac{1}{4}$
	410—81				
	376—70	Charges			
	412—82	To Cost of 5 Barrels			
		and 10 Hhds l. 4-7-9			
	2026—389	To Storage —1-0-0	5	7	9
			234	19	10 $\frac{1}{4}$
		To Commission at 5 p. C.	11	14	11 $\frac{1}{4}$
		Errors excepted, per A B.			

An Account of Sales.

Port Royal in Jamaica, July 24th, 1733.

OF 2765 Ells of Brown Ozenbrigs, 1112 Yards of blue Hartford, 2 Pieces of Grey Cloth gr. 39 Yards, 40 pair of fine Worsted Hose, and 170 Ells of Bag Holland, received from on Board the Ship *Good Success*, Capt. *Samuel Sharp*, Commander, for Account of *Laurence Lucky* of London, Merchant, is Dr.

To Portage of ditto —————	l. 00-17-6	l.	s.	d.
To Commission of Sales —————	12-16-3			
To Storage at 2 $\frac{1}{2}$ per C. —————	06-08-1 $\frac{1}{2}$			
		20	1	10 $\frac{1}{2}$
To Balance of the Nett proceed carried to the Credit of your Account, bad Debts excepted —————		236	3	9 $\frac{1}{2}$

256 5 8

Per Contra. Cr.

By 2765 Brown Ozenbrigs, making 3456 Yds $\frac{1}{4}$ at 8 d. $\frac{1}{2}$ per Yd. sold <i>Ambique Baker</i> —————	122	10	2
By 1112 Yds of blue Linnen, sold at 7 d. $\frac{3}{4}$ per Yard —————	34	3	5
By <i>James Smart</i> , for 39 Yds of Cloth, at 15 s. per Yd —————	29	5	—
By <i>Laurence Monk</i> , for 50 pair of Hose, at 7 s. 10 d. per pair —————	15	13	4
By ditto for 175 Ells of Bag Holland, at 6 s. 3 d. per Ell —————	54	13	9
	256	5	8

Errors excepted, *July 24th, 1733,*
per *Charles Careful.*

Business

Business at the Water-side, concerning Exporting and Importing of Goods, &c. Entering them at the Custom-house, &c.

WHEN there are Goods to Export, and ready pack'd, &c. there must first be made a Bill of Entry (as it is called) of the Contents, after this Form, viz.

In the Loyal Merchant, *William Worm*, for Barbadoes.
Edwin Export.

Three Cases of Haberdashery.
Five Tuns of Beer, &c.

Of these Bills there must be seven, one of which must be in Words at length, and the other may be expressed in Figures: These are by the Clerks of the Custom-house enter'd into several Books for that Purpose.——If some Goods pay Custom, and others not, then there must be made two Entries; one for those that pay Custom, and another for those that pay not: And likewise you must have two Cockets.

A Cocket testifies the Payment of all Duties; and is writ on a small piece of Parchment, in the following Words:

Know ye, That Edwin Export, Merchant, for Three Cases of Haberdashery, and Five Tuns of Beer, in the Loyal Merchant, William Worm, for Barbadoes, hath paid all Duties. Dated 9th of November, 1733.

On the Backside of the Cocket, you must set down the Marks, Numbers, and Quantity of the Goods expressed in the Inside.——Then on clean Paper Transcribe your Bill of Entry; upon which a Shipping Bill will be made out; on the Back of which, signify the Marks,

Marks, Numbers, and Contents, as before on the *Cocket*; both which being thus Endorsed, you are to deliver them to the Searcher at the Water-side, who deposits them in the Office till the going away of the Ship, and then they are delivered to the Captain or Master of the Ship.

If you have not Judgment or Experience enough to enter your Goods your self, 'tis but applying your self to any one of the Clerks in the Long-Room, who make it their Business (and good Business too) to enter Peoples Goods; and for a Shilling, (you giving them the Contents) they will write your Bills, and pass your Entries, without giving you any further Trouble, or your running any Risque of making any false Entries, &c.

Entry Inwards.

THE Ship being arrived, search the Entry Book in the Long-Room, and you will find the Name of the Ship and Captain, as also the Waiters that are to attend the Delivery of the Ship, and at what Key the Goods will be landed. The Entry Inwards runs thus:

In the *Mercury*, *John Keenhaul*, from *Antegoa*.
25 Hhds of Sugar, &c.
56 Bags of Cotton, &c.

There must be eight of these Bills, (though but seven Outwards) and one of these must be in Words at length, (as well as one of the seven Bills Outwards) which is for the Warrant of Delivery; and must be signed by the Person in whose Name the Goods are entred; and the Mark also in the Margin: Which being done, and the Fee for Entry, and Custom paid, you will then have from the Land-Waiters a Warrant for the Landing and Receiving your Goods.

When

When Goods are to be Exported by Certificate, &c. Foreign Goods formerly Imported; these Goods being to be sent Abroad, or Exported to another Place or Country by a Native of *England* within Twelve, or a Stranger within Nine Months after Importation, entitles the Exporter to a Drawback of part of the Custom paid at the Importation of the said Goods, (producing a Certificate from the Comptroller, that they have paid the Duties Inwards.) And the Debenture of Custom Drawback runs thus:

Debenture.

Christopher Commerce, *Natural born, did on, &c.* make an Entry with us of Two thousand Ells of Broad Germany Linnen, in the Amazon, Capt. Stephen Stout, for Jamaica, the Subsidy, &c. was paid Inwards by, &c. as appears per Certificate of the Collector Inwards: And for farther Manifestation of his just Dealing herein, he hath also taken Oath before us of the same. Customhouse, London, 9th November, 1733.

The Oath.

Juravit C. C. that Two thousand Ells of broad Germany Linnen, above-mentioned, was really Ship'd out, and hath not been relanded in any Port or Creek in England or Wales, since last Ship'd. Nov. 9th, 1733.

The Certificate Cocket.

London; Know ye, That C. C. for Two thousand Ells of broad Germany Linnen, paid per &c. the Day &c. last, late unladen, and now in the Amazon, Stephen Stout, for Jamaica. Dated the 9th of November, 1733.

This Certificate Cocket is gained by applying to the Books of the Importer, to know the Day, &c. when the Custom Inward was paid, and by whom; which carry to the Long-Room in the Customhouse, and deliver it to the Comptroller's Clerk of the Subsidy Inward and Outward, with an Account of what you would Export, &c.

A little

A little before was mentioned at what Key the Goods should be Landed, and therefore here it is proper to Name the Keys (or rather Kays) and Wharfs that Goods are usually Landed at ; which are these, viz.

Somer's Key, Smart's Key, Wiggen's Key, Bear Key, Dice Key, Customhouse Key, Porter's Key, Wooll Key, Gally Key, Brewer's Key, Ralph's Key, Chester's Key, Lyon's Key, Cox's Key; Hammond's, Young's, and Gaunt's Keys. And the Wharfs are, *Fresh Wharf* and *Botolph Wharf*.

Besides these, there are certain Places called *Docks*, which are Harbours cut into the Land, where there is no Current, but only a Flow, and an Ebb, occasioned by the Rise and Fall of the Tide in the River of *Thames* ; and these are convenient for the Lying of Vessels, Hoys, Lighters, Barges, and Boats ; and are these, viz.

Billingsgate Dock, Sabb's Dock, Tower Dock, St. Katherine's Dock, Wapping Dock, Hermitage Dock, Execution Dock, and Limehouse Dock. And above Bridge, *Queenhithe Dock, Puddle Dock, White-Fryer's Dock, and Scotland-yard Dock.* And on *Southwark* or *Surrey* side, are, *St. Saviour's Dock, Clink Dock, Savery's Dock* below the Bridge-yard, and *Shadwell Dock* ; and several others for private Uses—But more particularly Eminent on that side the Water, is the *Bridge-yard* for Landing sundry Sorts of Merchandize, but chiefly from the Ports of *England*.

Of Wharfage and Lighterage.

WHarfingers have several Managers over them, and also a Committee to redress Grievances, &c. and Clerks of the Stations, with Lighter Managers ; and have the Letting of many Warehouses, (which now are very fine and commodious, being rebuilt since the sad Fire in *Thames-street*) Cellars, &c.

M

and

and have the Privilege of keeping Lighters for the Carriage of Goods to and from Ships.

The Rates of Wharfage

Is generally computed at 12 d. per Tun, whether Outwards or Inwards; except Sugars from the *West-Indies*, which pay 2 s. per Tun, 4 Hogsheads being accounted a Tun (though they weigh more); Crainage is included in the 12 d. per Tun Wharfage; and for Lighterage, the Wharfingers have 12 d. per Tun for 4 Hogsheads of Sugar that come from the *West-Indies*; and for Wine and other Goods, the Lighterage is half as much as the Wharfage.

Husbands of Ships.

WHere several Persons are concerned in a Ship, there is usually a Husband chosen by them to take an Account of every Merchant's Goods, &c. and pay the Wharfage, Literage, Porterage, &c. and these Husbands are to collect every Merchant's Proportion, when they do the Owner's Freight.

An

An Account of the several Counties of
England and *Wales*, with their Pro-
duce, Market-Towns, and Market-
Days, &c.

Note, m stands for Monday, *tu* for Tuesday, *w* for
Wednesday, *th* for Thursday, *f* for Friday, and
s for Saturday.

Berkshire

IS supposed to contain about 527000 Acres, is 120
Miles in Circumference, hath plenty of Corn,
Cattle, Wooll, and Wood, (especially Oak) and is
accommodated with Water Carriage, by the very fine
Rivers of *Thames* and *Kennet*;

And hath these Market-Towns, viz.

Reading, the Shire-Town, Market-day on Saturday.

Abbingdon, *m* and *f*

Windfor, *f*

Wallingford, *tu* and *f*

Maidenhead, *w*

Hungerford, *w*

Newbury, *th*

Farrington, *tu*

Wantrage, *f*

East-Isley, *w*

Oakingham, *th*

Buckinghamshire

Is an Inland County as well as *Berkshire*; it contains
about 441000 Acres, is 138 Miles in Circumference,
abounds in Corn and Cattle, and is very considerable
for Wooll. The principal Rivers in this Shire are *Tame*,
Onze, and *Coln*.

Market Towns.

Buckingham, <i>f</i>	Stony-Strafford, <i>f</i>
Alesbury, <i>f</i>	Oundle, <i>m</i>
High Wickham, <i>f</i>	Beconsfield, <i>tb</i>
Marlow, <i>f</i>	Chesham, <i>w</i>
Wendover, <i>tb</i>	Risborough, <i>f</i>
Amersham, <i>tu</i>	Invingho, <i>f</i>
Newport-pagnel, <i>f</i>	Winflow, <i>tb</i>
Colebrook, <i>w</i>	

Bedfordshire

Contains about 260000 Acres, is 73 Miles in Circumference, well stored with Corn and Cattle, and famous for Fullers Earth, &c.

Market Towns.

Bedford, <i>tb</i> and <i>f</i>	Luton, <i>m</i>
Dunstable, <i>w</i>	Shefford, <i>f</i>
Woeburn, <i>f</i>	Biggleswade, <i>tb</i>
Ampton-Hill, <i>tb</i>	Potton, <i>f</i>
Leighton, <i>m</i>	Tuddington, <i>f</i>

Cambridgeshire

Is an Inland County, contains about 570000 Acres; is 130 Miles in Circumference, and affords plenty of Corn, Cattle, and Wild Fowl. *Cambridge* is the Shire Town, and remarkable for a famous University, containing 12 Colleges, and 4 Halls, all well endowed, and are as followeth, viz.

Colleges

Colleges.

When Founded.	By whom Founded.
1284 <i>Peter-house</i> , —	by Hugh de Batham, Bp. of Ely.
1346 <i>Corpus Christi</i> , }	by Henry of Monmouth, Duke
or <i>Bennet</i> , }	of Lancaster.
1348 <i>Gonvil & Caius</i> , —	so call'd from its several Founders.
1441 <i>King's</i> —, —	by King Henry the 6th.
1448 <i>Queen's</i> —, —	by Margaret his Queen.
1497 <i>Jesus</i> —, —	by L. L. D. Bp. of Ely.
1506 <i>Christ's</i> —, —	by Margaret, Countess of Richmond.
1506 <i>St. John's</i> —, —	by ditto.
1542 <i>Magdalen</i> —, —	by Edw. Stafford, D. of Buckingham.
1546 <i>Trinity</i> —, —	by King Henry the 8th.
1584 <i>Emanuel</i> —, —	by Sir Walter Mildmay.
1598 <i>Sidney Sussex</i> , —	by Frances Sidney, Countess of Sussex.

Halls.

1343 <i>Clare</i> —, —	by Richard Badew.
1347 <i>Pembroke</i> —, —	by Mary, Countess of Pembroke.
1353 <i>Trinity</i> —, —	by W. Bateman, Bp. of Norwich.
1549 <i>Catharine</i> —, —	by Robert Wood, the Chancellor.

Market Towns.

Cambridge, <i>f</i>	Merche, <i>f</i>
Ely, <i>tu</i>	Wisbich, <i>f</i>
Caxton, <i>tu</i>	Royston, <i>tu</i>
Linton, <i>tb</i>	Soham, <i>f</i>
New-Market, <i>tu</i>	

Cheshire.

Is a Maritime or Sea-County, containing 720000 Acres, and is in Circumference about 118 Miles. Cheese and Salt are the principal Commodities: For the first,

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no place in the World equals it ; and for the latter, if there was but a sufficient Quantity, there would be no Occasion of Voyages to the Isle of May.

Market-Towns.

Chester, <i>w</i> and <i>f</i>	Frodsham, <i>w</i>
Congleton, <i>f</i>	Stockport, <i>f</i>
Nampwich, <i>f</i>	Sandwich, <i>tb</i>
Middlewich, <i>f</i>	Altringham, <i>tw</i>
Norwich, <i>f</i>	Malpas, <i>m</i>
Macclesfield, <i>m</i>	Knotsford, <i>f</i>

Cornwall

Is a Maritime County in the most Western part of the Kingdom, containing about 960000 Acres, and is 150 Miles in Circumference. The chiefest Commodities are Tin and Copper, particularly the former ; it also affords great Plenty of Wild Fowl, especially Woodcocks in the Season : It likewise yields great Quantities of Samphire, Eringo, fine Slate, and Marble ; above all the rest, vast Quantities of Fish, which are yearly exported to *France, Spain,* and other foreign Countries.

Market Towns.

Lanceston is the chief	Penrin, <i>w, f</i> and <i>f</i>
Town, <i>f</i>	Tregony, <i>f</i>
Lestard, <i>f</i>	St. Ives, <i>w</i> and <i>f</i>
Listwithel, <i>f</i>	Pensance, <i>tb</i>
Pruro, <i>w</i> and <i>f</i>	Foway, <i>f</i>
Bodmin, <i>f</i>	St. German, <i>f</i>
Helston, <i>f</i>	St. Columbe, <i>tb</i>
Padstow, <i>f</i>	Falmouth, <i>tb</i>
Carnelford, <i>f</i>	Market-jew, <i>tb</i>
Crampound, <i>f</i>	

Cumberland

Cumberland

Is also a Maritime Country, bounded Northward with *Scotland*, and Westward with the *Irish Sea*; it contains about 1040000 Acres, and is in Circumference 168 Miles; it is a fruitful Country, affording good Pasture on the Hills, and good Corn in plenty in the Vallies: Fish and Wild Fowl are very plentiful, and Coals in abundance; likewise large Mines of Lead and Copper, which are both very good in their Kind.

Market-Towns.

Carlisle is the chief, <i>f</i>	Holm, <i>f</i>
Cockermouth, <i>tu</i>	Egermont, <i>f</i>
Whitehaven, <i>tb</i>	Kirke Oswald, <i>tb</i>
Penrith, <i>tu</i>	Longtown, <i>tb</i>
Keswick, <i>f</i>	Ravenglass, <i>f</i>
Brampton, <i>tu</i>	Wigtown, <i>tu</i>

Derbyshire

Is an Inland County, 130 Miles in Circumference, and contains about 680000 Acres, affords good store of Corn and Wood, likewise considerable Quantities of Free-stone and Marble, Coal and Lead Mines in abundance; also it yields Chrystal and Alabaster.

Market-Towns.

The County Town is	Ashburn, <i>f</i>
Derby, <i>f</i>	Alfreton, <i>m</i>
Chesterfield, <i>f</i>	Bakewell, <i>m</i>
Worksworth, <i>tu</i>	Dronsfild, <i>tb</i>
Bolsover, <i>f</i>	Fiddlewall, <i>w</i>

Devonshire

Is a Maritime County, about 200 Miles in Circumference, and contains near 1920000 Acres; it lies on the West of *England*, and joins to *Cornwall*, having the Sea on the North and South; it affords great plenty of Corn, Wooll, Fowl and Fish; as also Lead and Tin Mines; but the principal Manufactures are Kerfies, Serges, and Lace.

Market Towns.

Exon is the capital, <i>w & f</i>	Biddiford, <i>tu</i>
Barnstaple, <i>f</i>	Torrington, <i>f</i>
Honiton, <i>f</i>	Axminster, <i>f</i>
Oakhampton, <i>f</i>	Culliton, <i>th</i>
Plimpton, <i>f</i>	Dodbrook, <i>w</i>
Tavistock, <i>f</i>	Autrey, <i>tu</i>
Tiverton, <i>tu</i>	Cudee, <i>f</i>
Plimouth, <i>m</i> and <i>tu</i>	Hatherleo, <i>tu</i>
Totness, <i>f</i>	Moreton, <i>f</i>
Ashburton, <i>f</i>	Kingsbridge, <i>f</i>

Dorsetshire

Is a County exceeding pleasant and fruitful, and lies upon the Channel, being 150 Miles in Circumference, and contains about 772000 Acres, yielding great plenty of Corn, Cattle, Wooll, Fish and Wild Fowl; and also it affords abundance of Hemp, Free-stone and Marble.

Market Towns.

Dorchester is the County	Cranborn, <i>w</i>
Town, <i>f</i>	Blandford, <i>f</i>
Weymouth, <i>tu</i> and <i>f</i>	Abbotsbury, <i>th</i>
Melcomb Regis, <i>tu</i> and <i>f</i>	Cerne, <i>w</i>
Shaftsbury, <i>f</i>	Frampton, <i>th</i>
Pool, <i>m</i> and <i>tu</i>	Sherbourn, <i>tu</i> and <i>f</i>
Wareham, <i>f</i>	Wimbourn, <i>f</i>
Corfe-castle, <i>tu</i>	Sturminster, <i>th</i>

Durham

Durham

Is a County Palatine, and lies very far in the North of the Kingdom, the Air very cold, and the Ground not so fruitful as the Southern Parts: 'Tis 107 Miles in Circumference, and contains about 610000 Acres; its chief Commodities are Coal, Iron and Lead.

Market Towns.

Durham is the principal, <i>f</i>	Sunderland, <i>f</i>
Aukland, <i>th</i>	Bernard's-Castle, <i>w</i>
Darlington, <i>m</i>	

Essex

Is a County bounded by the Sea, and lies in the Eastern Part of England; is 146 Miles in Circumference, and contains 1240000 Acres; the Soil yields plenty of Corn, Cattle, and Wood: At *Wallden* it affords great Store of Saffron; and the best in the whole World, the *Spanisb* being nothing in Comparison to it.

Market Towns.

Colchester is the County Town, <i>f</i>	Brentwood, <i>th</i>
Harwich, <i>tu</i>	Dumore, <i>f</i>
Malden, <i>f</i>	Cogshall, <i>f</i>
Chelmsford, <i>f</i>	Graves, <i>th</i>
Barking, <i>f</i>	Halstead, <i>f</i>
Hatfield, <i>f</i>	Hornden, <i>f</i>
Rumford, <i>w</i>	Raleigh, <i>f</i>
Wallden, <i>f</i>	Maintree, <i>tu</i>
Epping, <i>th & f</i>	Waltham Abbey, <i>tu</i>
Braintree, <i>w</i>	Troxtead, <i>f</i>
Billercay, <i>tu</i>	Sudbury, <i>f</i>

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Glocestershire

Is a County exceeding fruitful and delightful ; and, take it all together, one of the pleasantest Parts of the Kingdom : It contains about 800000 Acres, affords some of the best Cheese in the Nation, and Wooll hardly inferior to *Spanish*. It also abounds in Wood, Iron, Steel, and Salmon ; but its chiefest Manufacture is the Woollen, which is very extraordinary.

Market Towns.

Glocester, the County	Lechlade, <i>tu</i>
Town, <i>w</i> and <i>f</i>	Newent, <i>f</i>
Cirencester, <i>m</i> and <i>f</i>	Sudbury, <i>tb</i>
Tewksbury, <i>f</i>	Pauswick, <i>tu</i>
Blackley, <i>w</i>	Stow, <i>tb</i>
Dursley, <i>tb</i>	Tedbury, <i>w</i>
Campden, <i>w</i>	Wickmore, <i>m</i>
Newham, <i>f</i>	Toornbury, <i>f</i>
Stroud, <i>f</i>	Winchcomb, <i>f</i>
Cheltenham, <i>tb</i>	Wotton, <i>f</i>

Hampshire,

Or the County of *Southampton*, borders upon the Channel, being a pleasant, healthful, and fruitful Country, about 100 Miles in Circumference, and contains about 1312500 Acres : It affords vast plenty of Corn, Grass, Sheep, and Wood, and particularly famous for Hogs and Honey, both of which are most excellent in their Kind.

Market Towns.

Southampton the County	Portsmouth, <i>tb</i> and <i>f</i>
Town, <i>tu</i> and <i>f</i>	Andover, <i>f</i>
Winchester, <i>w</i> and <i>f</i>	Limington, <i>f</i>

Alton;

Alton, <i>f</i>	Odiam, <i>f</i>
Basingstoke, <i>w</i>	Rumsey, <i>f</i>
Kinsclear, <i>tu</i>	Alceston, <i>tb</i>
Ringwood, <i>w</i>	

Hertfordshire

Is a very fine inclos'd County, the Land somewhat Stony, but yet very fruitful, affording great plenty of Corn, and 's very remarkable for good Malt; it is 130 Miles in Circuit, contains about 451020 Acres, and hath an excellent Air, &c.

Market-Towns.

Hertford is the County	Buntingford, <i>m</i>
Town, <i>f</i>	Baldock, <i>tb</i>
St. Albans, <i>f</i>	Hitchin, <i>tu</i>
Barnet, <i>m</i>	Hodsdon, <i>tb</i>
Ware, <i>tu</i>	Stevenage, <i>f</i>
Barkhamsted, <i>m</i>	Tring, <i>f</i>
Rickmansworth, <i>f</i>	Watford, <i>tu</i>
Hatfield, <i>tb</i>	Hempsted, <i>tb</i>

Herefordshire

Is an Inland County, of a good Soil, and healthful Air, 100 Miles in circuit, and contains about 660000 Acres: It affords plenty of Wooll, Wheat, Salmon, and Cyder, which are generally esteemed the best in the Kingdom.

Market-Towns.

Hereford is the	Weobly, <i>tb</i>	Pemb, <i>tu</i>
Capital, <i>w, ff</i>	Kyniton, <i>w</i>	Ledbury, <i>tu</i>
Lempster, <i>f</i>	Rofs, <i>tb</i>	Bromyard, <i>m</i>

Huntington

Huntingtonshire

Is a small Inland County, of about 67 Miles in Circuit, and contains about 240000 Acres: It is an open Country, but generally very fertile and delightful, abounding in Corn and Cattle, which are its chiefest Commodities.

Market Towns.

Huntington the
chief, *f*
St. Ives, *m*
Kimbolton, *f*

St. Neots, *tb*
Ramsey, *w*
Yaxley, *tu*

Kent

Is a Sea-County, on the East part of the Channel; it is 160 Miles in Circumference, and contains about 1248000 Acres, being distinguished into three Parts, viz. the Marshy, as Romney Marsh, &c. the Downs; the Middle or Woody Part. It affords Plenty of Corn, good Pasture, and the best Cherries and Pippins in the Kingdom.

Market Towns.

Canterbury (fa-
mous for its
Cathedral) is
the Capital,
w and *f*
Rochester, *f*
Maidston, *tb*
Dover, *w* and *f*
Sandwich, *w*
and *f*
Romney, *tb*

Smarden, *f*
Hithe, *f*
Bromley, *tb*
Cranebrook, *f*
Cray, *w*
Dartford, *f*
Eltham, *m*
Faversham, *w*
and *f*
Folkston, *tb*
Gravesend, *w* & *f*

Lenham, *tu*
Lidd, *tb*
Seven Oak, *f*
Tenterden, *f*
Malling, *f*
Milton, *f*
Tunbridge, *f*
Westram, *w*
Woolwich, *f*
Wrotham, *tu*
Wye, *tb*

Suffex

Sussex

Is a Maritime County, lying upon the Channel between *Kent* and *Hampshire*, containing 1140000 Acres; and is 158 Miles in Circumference. The Country is both fertile and healthful, and is most exceeding pleasant; the South Downs being the most delectable and delightful Part of the whole Kingdom; and as I know them, I alledge them to have the most beautiful Variety, and the pleasantest Prospect that can be in the whole Culture of Nature; the Soil being exceeding rich, occasioned by the numerous Flocks of Sheep there kept; and therefore produces wonderful Crops of Corn of all Sorts: It also hath the finest Woods and Rivers, and affords the best of Game of Hunting, Fishing, and Fowling.

Market Towns.

Chichester is the chief,
w and *f*

East-Grinstead, *tb*

Hastings, *w* and *f*

Rye, *w* and *f*

Arundel, *w* and *f*

Horseham, *f*

Midhurst, *tb*

Steyning, *w*

Petworth, *w*

Battle, *tb*

Hailsham, *f*

Bright-Helmston, *tb*

Cuckfield, *f*

Lancashire

Is a Sea-Coast County, bounded on the West by the *Irish* Sea; 'tis 170 Miles in Circuit, and contains 1150000 Acres; the Air is very wholesome, and the People generally live to an advanced Age: The Soil is very good, and yields Corn of all Sorts, particularly Oats, which are looked upon as the best in the Kingdom: It affords also plenty of Pit-Coal, and great Quantities of excellent Fish of all Sorts.

Market

Market Towns.

Lancaster is the	Ulverston, <i>tb</i>	Roachdale, <i>t</i>
County Town <i>f</i>	Bolton, <i>m</i>	Howstead, <i>m</i>
Clithero, <i>f</i>	Blackbourn, <i>m</i>	Hoflingdon, <i>w</i>
Liverpool, <i>f</i>	Carmel, <i>m</i>	Garistrong, <i>tb</i>
Preston, <i>w, f & f</i>	Coln, <i>w</i>	Kirkham, <i>tu</i>
Wigan, <i>m & f</i>	Bury, <i>tb</i>	Hornby, <i>m</i>
Manchester, <i>f</i>	Charnley, <i>tu</i>	Ormskirk, <i>tu</i>
Warrington, <i>w</i>	Dalton, <i>f</i>	Poulton, <i>m</i>

Leicestershire

Is a fine pleasant Inland County, 96 Miles in Circuit, contains about 560000 Acres, abounds in Corn and good Pasture, and is very remarkable for Beans and Peas for Horses, which thrive there the best of any County in *England*; it is also eminent for large Sheep, which produce abundance of Wooll, and the longest in the Kingdom.

Market Towns.

Leicester is the County	Hinkley, <i>m</i>
Town, <i>m</i> and <i>f</i>	Lutterworth, <i>tb</i>
Ashby de la Zouch, <i>f</i>	Loughburrugh, <i>tb</i>
Bolsworth, <i>w</i>	Milton, <i>tu</i>
Harborough, <i>tu</i>	Mountsorrel, <i>m</i>
Hallaton, <i>tb</i>	Waltham, <i>w</i> and <i>tb</i>

Lincolnshire

Is a Maritime County, part bordering on the *German* Sea, and contains about 1740000 Acres, being 130 Miles in Circuit: The Western parts are good and fruitful, having plenty of Grass, and breed the largest Oxen in the Kingdom; but the Eastern Parts are Marshy, though well stored with Wild Fowl.

Market

Market Towns.

Lincoln is the	Stanton, <i>m</i>	Womsfleet, <i>f</i>
Capital, <i>f</i>	Binbrook, <i>w</i>	Dunnington, <i>f</i>
Boston, <i>w</i> and <i>f</i>	Alford, <i>tu</i>	Falkingham, <i>tb</i>
Grantham, <i>f</i>	Burton, <i>m</i>	Holbeck, <i>tb</i>
Stamford, <i>m</i> & <i>f</i>	Barton, <i>m</i>	Hornicastle, <i>f</i>
Grinsby, <i>w</i>	Kirton, <i>tb</i>	Louthe, <i>w</i> & <i>f</i>
Gainsborough, <i>tu</i>	Bourn, <i>f</i>	Sleeford, <i>m</i>
Bullingbrook, <i>tu</i>	Tattershall, <i>f</i>	Spilsby, <i>m</i>
Spalding, <i>tu</i>		

Middlesex

Is the Metropolis of the Kingdom, an Inland County, having the Soil fertile by Improvement, and the Air sweet and wholesome as in any the Kingdom; the *Thames* that runs through it, parts it from the County of *Surry*, and is on all Accounts the finest River in the World.

Market Towns.

LONDON, the Metropolis,	Stains, <i>f</i>
hath Markets for every	Uxbridge, <i>tb</i>
Day in the Week.	Enfield, <i>f</i>
Westminster, <i>m</i> , <i>w</i> , and <i>f</i>	Edgworth, <i>tb</i>
Brentford, <i>tb</i>	

Monmouthshire

Lies on the Borders of *Wales*, and formerly reckoned a part of it, but now numbered among the *English* Counties: It is accommodated by the famous River *Severn*, the second in the Kingdom; and contains 340000 Acres, being 80 Miles in Circuit. This County is healthful, abounding with Corn, Cattle, Salmon, and Trout.

Market Towns.

Monmouth the	Caerleon, <i>tu</i>	Pontpool, <i>f</i>
principal, <i>f</i>	Chepstow, <i>f</i>	Uske, <i>m</i> and <i>f</i>
Abergavenny, <i>tu</i>	Newport, <i>f</i>	

Norfolk

Norfolk

Is a large Sea-County, bordering on the Northern Coast, upon the *German Sea*; 'tis 180 Miles in Circuit, and contains 1148000 Acres. The Soil is different, in some Places fertile, in others sandy, and in some deep and heavy. Its principal Commodities are Corn, Wooll, Honey, and some Saffron; but the chief of it are Stuffs and Herrings, the first from *Norwich*, and the latter from *Tarmouth*. Sometimes Jet and Amber are found on the Sea-Coast.

Market Towns.

Norwich is the	Dearham, <i>f</i>	Caston, <i>tu</i>
Capital, <i>w, f,</i>	Walsingham, <i>f</i>	Comer, <i>f</i>
and <i>f</i>	Downham, <i>f</i>	Diss, <i>f</i>
Linn, <i>tu</i> and <i>f</i>	Walsingham, <i>w</i>	Harleston, <i>w</i>
Yarmouth, <i>f</i>	Windham, <i>f</i>	Herling, <i>tu</i>
Thetford, <i>f</i>	Ropeham, <i>f</i>	Holt, <i>f</i>
Attleborough, <i>tb</i>	Snasham, <i>f</i>	Wotton, <i>w</i>
Alesham, <i>f</i>	Falkenham, <i>tb</i>	Worsted, <i>f</i>
Buckingham, <i>f</i>	Foulsham, <i>tb</i>	Seby, every <i>se-</i>
Burnham, <i>f</i>	Hingham, <i>f</i>	cond Monday:

Northamptonshire

Is accounted one of the finest Inland Counties in the Kingdom; is 120 Miles in Circuit, and contains about 550000 Acres. The Air good, and the Soil rich; hath several fine Rivers; and abounds in Corn, Wood and Cattle.

Market Towns.

Northampton is	Daventry, <i>w</i>	Wellingborough
the County-	Oundle, <i>f</i>	<i>w</i>
Town, <i>f</i>	Towcester, <i>f</i>	Trapstone, <i>tu</i>
Peterborough, <i>f</i>	Rothwell, <i>m</i>	Cliff, <i>tu</i>
Brackley, <i>w</i>	Kettering, <i>f</i>	

Northumberland

Northumberland

Is a Sea-County, bordering upon *Scotland* ; in some Part the Air is sharp, the Soil thin and barren ; but towards the Sea it is tolerably fruitful. In this County are abundance of Lead and Coal Mines, from whence come the Coals called Sea-Coals. Here are good store of Wild Fowl and Fish, particularly Salmon.

Market Towns.

Newcastle is the chief		Morpeth, <i>w</i>
Town, <i>f</i>		Saxham, <i>tu</i>
Berwick, <i>f</i>		Weller, <i>tu</i>

Nottinghamshire

Is an Inland County, in Circuit 110 Miles, and contains 560000 Acres : The Air is good and healthful, the Soil but indifferent, (a great Part being Forest Ground) the South Part pretty fruitful, the West woody, and yields plenty of Pit-Coal. The River *Trent* divides it from *Lincolnshire*.

Market Towns.

Nottingham is the County		Southwell, <i>f</i>
Town, <i>w, f, and f</i>		Bingham, <i>tb</i>
Newark, <i>w</i>		Worsop, <i>w</i>
Retford, <i>f</i>		Tuxford in the Clay, <i>m</i>
Mansfield, <i>tb</i>		

Oxfordshire

Is one of the most pleasant, healthful, and fertile Counties in the Kingdom ; 'tis watered with delightful Rivers, as the *Thames*, the beautiful *Charrald*, &c. but

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but above all, it is famous for having the finest University in the World, which consists of 18 Colleges endowed, and 7 Halls not endowed, viz.

Founded Colleges. *By whom Founded,*
Anno

- 872 *University*, by the Saxon King Alfred.
1262 *Baliol*, by John Baliol, King of Scotland.
1274 *Merton*, by Walter de Merton, Bp. of Rochester.
1316 *Exeter*, by Walter Stapleton, Bp. of Exeter.
1337 *Oriel*, by King Edward II.
1340 *Queens*, by Robert Eglesfield, B. D.
1375 *New*, by William of Wickham, Bishop of Winchester.
1420 *Lincoln*, by Richard Flemming, Bp. of Lincoln.
1437 *All-Souls*, by Henry Chicheley, A. Bp. of Cant.
1459 *Magdalen*, by William of Womfleet, Bp. of Winchester.
1515 *Brazen-Nose*, by William Smith, Bp. of Lincoln, and Richard Sutton.
1516 *Corpus Christi*, by Richard Fox, Bp. of Winchester.
1542 *Christ's Church*, by King Henry VIII.
1555 *Trinity*, by Sir Thomas Pope.
1557 *St. John's*, by Sir Tho. White, Mercht. of Lond.
1572 *Jesus*, by Queen Elizabeth.
1613 *Wadham*, by Nicholas Wadham, Esq;
1620 *Pembroke*, by Thomas Tefdale, Esq; and Richard Whitwick, B. D.

Halls.

St. Edmonds	} belonging to {	Queen's	} College
St. Albans		Merton	
Hart		Exeter	
St. Mary's		Oriel	
New-Inn		New	
Magdalen		Magdalen	
Glocester			

Marked

Market Towns in Oxfordshire.

Oxford the Ca-	Henley, <i>tb</i>	Deddington, <i>f</i>
pital, <i>w</i> and <i>f</i>	Watlington, <i>f</i>	Bicester, <i>f</i>
Woodstock, <i>tu</i>	Witney, <i>tb</i>	Bampton, <i>w</i>
Banbury, <i>tb</i>	Chipping-Nor-	Tame, <i>tu</i>
Burford, <i>f</i>	ton, <i>f</i>	Charlbury,

Rutland

Is a small Inland County, 40 Miles in Circumference, containing about 110000 Acres; affords plenty of Corn and Cattle, and is remarkable for the Redness of the Wooll which the Sheep of that County produce, occasioned by the Colour of the Soil.

Market Towns.

Oakhampton, <i>f</i>	Uppingham, <i>w</i>
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Shropshire

Is a plentiful Inland County, the Air good, and so is the Soil; it is in Circuit 134 Miles, containing about 890000 Acres, and affords plenty of Corn, Wood and Pit-coal, being accommodated by the River Severn.

Market Towns.

Shrewsbury the	Ludlow, <i>m</i>	Drayton, <i>w</i>
County Town,	Wenlock, <i>m</i>	Wen, <i>tb</i>
<i>w</i> , <i>tb</i> , and <i>f</i>	Elismore, <i>tu</i>	Chur. stretton, <i>tu</i>
Bishops-castle, <i>f</i>	Whitchurch, <i>f</i>	Ofwestry, <i>m</i>
Bridge-north, <i>f</i>	Newport, <i>f</i>	Shipton, <i>tu</i>

Somersetshire

Is a large plentiful Sea-County in the West of England, in Circumference 204 Miles, containing about 907500 Acres; it affords great plenty of excellent Corn,

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Corn, and good Pasture, which feeds abundance of fine Cattle; and also yields plenty of Lead, Copper, Chryſtal Stones, and Wood for Dyers: Its chief Manufactures are Cloth and Serges.

Market Towns.

Bristol is the Capital, <i>w</i> and <i>f</i>	Southpetherton, <i>tb</i>	Wivelfcomb, <i>tu</i>
Bath, <i>w</i> and <i>f</i>	Axbridge, <i>tb</i>	Canesham, <i>tb</i>
Wells, <i>w</i> and <i>f</i>	Sheptonmallet, <i>f</i>	Crookhorn, <i>f</i>
Bridgewater, <i>tb</i>	Somerton, <i>m</i>	Dulverton, <i>f</i>
Ilceſter, <i>w</i>	Wellington, <i>tu</i>	Glaſtenbury, <i>tu</i>
Taunton, <i>w</i> & <i>f</i>	Bruton, <i>f</i>	Chard, <i>m</i>
Wincanton, <i>w</i>	Ilmiſter, <i>f</i>	Longport, <i>f</i>
Watchet, <i>f</i>	Dunſtar, <i>f</i>	Pouſford, <i>tu</i>
		Writton, <i>tu</i>

Staffordſhire

Is an Inland County, containing about 81000 Acres, and is 141 Miles in Circuit; the Air is ſharp, but very healthful; the Soil different: Northward 'tis hilly and barren; but Southward it is fruitful and pleaſant, and affords plenty of Corn, Graſs, Iron and Pit-Coal; the middle Part is level, but ſomething woody: This County alſo affords good Stone, Marble, Alabaſter and Lime-ſtone.

Market Towns.

Stafford is the County Town, <i>f</i>	Utuxetar, <i>w</i>	Betley, <i>tu</i>
Litchfield, <i>tu</i> & <i>f</i>	Eccleſhall, <i>f</i>	Locke, <i>w</i>
Newcaſtle, <i>m</i>	Ridgley, <i>tu</i>	Tudbury, <i>tu</i>
Burton, <i>tb</i>	Browley, <i>tu</i>	Stow, <i>tu</i>
Penbridge, <i>tu</i>	Breewood, <i>tu</i>	Wolverhampton
	Walſhall, <i>tu</i>	<i>w</i>

Suffolk

Suffolk

Is a Sea County, 140 Miles in compass, and contains 995000 Acres; the Soil different, the best Part about *St. Edmundsbury*; it affords abundance of Cattle, and Butter of the best, but Cheese the worst in *England*.

Market Towns.

Ipswich is the principal, <i>w</i> , <i>f</i> and <i>f</i>	Ixworth, <i>f</i>	Neyland, <i>f</i>
Dunwich, <i>f</i>	Needham, <i>w</i>	Lavenham, <i>tu</i>
Orford, <i>m</i>	Stowmarket, <i>tb</i>	Mildenhall, <i>f</i>
Albrough, <i>f</i>	Newmarket, <i>tb</i>	Bildeston, <i>w</i>
Sudbury, <i>f</i>	Beccles, <i>f</i>	Clare, <i>f</i>
Eye, <i>f</i>	Bury, <i>w</i>	Bungay, <i>tb</i>
Deddingham, <i>f</i>	Hadley, <i>m</i>	Holfworth, <i>tu</i>
	Framlington, <i>f</i>	Mendlesham, <i>tu</i>
	Lestoff, <i>w</i>	Woodbridge, <i>w</i>

Surrey

Is an Inland County, parted by the River of *Thames* from *Middlesex*: It contains about 592000 Acres, and is in Compass 112 Miles; the Country is plentiful, and the Air healthful; it is famous for Hunting and Horse-racing: The principal Goods are Hats made in *Southwark* for Exportation.

Market Towns.

Guilford is the County-Town, <i>f</i>	Dorking, <i>tb</i>
Southwark, <i>w</i> and <i>f</i>	Kingstone, <i>f</i>
Rigate, <i>tu</i>	Croydon, <i>f</i>
	Farnham, <i>tb</i>

Warwickshire

Warwickshire

Is a pleasant, healthful, and plentiful County, 155 Miles in compass, and contains about 670000 Acres; the Soil for the most part is good and fertile; on the North a little woody: This County is remarkable for excellent Cheese, going by its Name.

Market Towns.

Warwick is the	Aalcester, <i>tu</i>	Nuneaton, <i>f</i>
County-town, <i>f</i>	Birmingham, <i>th</i>	Rugley, <i>f</i>
Coventry, <i>f</i>	Colehill, <i>w</i>	Southam, <i>m</i>
Stratford, <i>th</i>	Henley, <i>m</i>	Suttonbofield,
Atherstone, <i>tu</i>	Kyneton, <i>tu</i>	<i>m</i>

Westmorland

Is a County in the North West of England, is 120 Miles in Circuit, containing about 510000 Acres: This County abounds in Hills and Marshes; and is not very plentiful but in some of the Valleys and Intervals, and towards the South.

Market Towns.

Appleby is the	Longdale, <i>th</i>	Kirbysteven, <i>f</i>
County-town, <i>f</i>	Burton, <i>tu</i>	Orton, <i>w</i>
Kendal, <i>f</i>	Ambleside, <i>w</i>	Brough, <i>w</i>

Wiltshire

Is a fine Inland County, 140 Miles in compass, and contains about 876000 Acres: In the Middle lies *Salisbury-Plain*, very remarkable for its large Extent, and for feeding large Numbers of Sheep; and therefore Wooll is the principal Commodity.

Market

Market Towns.

Salisbury is the	Lavington, <i>w</i>	Colne, <i>tu</i>
Capital, <i>w</i> & <i>f</i>	Wotton-basset, <i>tb</i>	Warminster, <i>f</i>
Hindon, <i>tb</i>	Cricklade, <i>f</i>	Bradford, <i>m</i>
Chippingham, <i>f</i>	Devizes, <i>tb</i>	Amsbury, <i>f</i>
Wilton, <i>w</i>	Downton, <i>f</i>	Auburn, <i>tu</i>
Marlborough, <i>f</i>	Wesbury, <i>f</i>	Swindon, <i>m</i>
Malmsbury, <i>f</i>	Highworth, <i>w</i>	Trounbridge, <i>f</i>

Worcestershire

Is a plentiful Inland County, 130 Miles in Circuit, and contains 540000 Acres; the Soil is for the most part good and fertile, affords Corn in great plenty, and is very numerous in Cattle; it yields plenty of Fish and Fruit. The Vale of *Evesham* is justly esteemed one of the most fertile Spots in the Kingdom.

Market Towns.

Worcester is the	Droitwich, <i>f</i>	Parlhone, <i>tu</i>
Capital, <i>w</i> , <i>f</i>	Sturbridge, <i>f</i>	Tidbury, <i>tu</i>
and <i>f</i>	Kidderminster,	Upton, <i>tb</i>
Evesham, <i>m</i>	<i>tb</i>	Shipton, <i>f</i>
Bewdley, <i>f</i>	Bromsgrave, <i>tu</i>	

Yorkshire

Is a Maritime County, and much the largest in all England; it is divided into Three parts called *Ridings*, viz. *North*, *East*, and *West*: 'Tis in general a plentiful Country, abounding in Corn, Cattle, Fish and Fowl, and famous for breeding fine Saddle Horses. It is 320 Miles in Circumference, and contains 3770000 Acres; it sends great Quantities of Woollen Cloth to London, and elsewhere, being its chiefest Manufacture.

Market Towns.

York is the Capital; Market Days *Thursday* and *Saturday*: With 36 other Market Towns, too numerous here to particularize,

The Principality of Wales.

WALES was originally independent on *England*, but in the Reign of King *Henry the VIIth*, it was incorporated with it. This Country is very mountainous and barren, except in the Valleys and Intervals, where it yields plenty of Grass and Corn. The Situation is Westward, bordering on the *Irish Sea*; the Air bleak and sharp, but wholesome; the Cattle are numerous, but very small; and on the Hills there are Goats in abundance. This Country is divided into North and South, *viz.*

North-Wales

Contains *Anglesey*, *Carnarvanshire*, *Denbighshire*, *Flintshire*, *Merionethshire*, and *Montgomeryshire*.

Anglesey is an Island in the North-West Part of the Country, about 80 Miles in compass, and contains about 200000 Acres. It affords plenty of Corn, Cattle, Fish, Fowl, and Millstones (for grinding of Corn) in abundance: It has but two Market Towns, *viz.* *Beaumaris* and *Newborough*; *Wednesday* is the Market Day of the first, and *Tuesday* of the latter.

Carnarvanshire is a Sea-coast Country, 110 Miles in compass, containing about 340000 Acres. It hath plenty of Corn, Cattle, Fish, and Wood; the Air is healthful, and the Soil good, especially the Western Part, which produces abundance of excellent Barley.

Market Towns.

<i>Carnarvan</i> is the chief, <i>f</i>	<i>Polbell</i> , <i>w</i>
<i>Bangor</i> , <i>w</i>	<i>Aberconway</i> , <i>f</i>
<i>Krobich</i> , <i>w</i>	<i>Newin</i> , <i>f</i>

Denbighshire

Denbighshire is 116 Miles in Circuit, and contains about 410000 Acres. The Middle of this County hath plenty of Rye, Coals and Sheep; it hath also some small Lead Mines; but the chief Part of it is a Valley called *Diffryn Clwyd*, exceeding pleasant and fertile, adorned with several Gentlemens Seats, and those of good Estates. *Denbigh* is the County Town, and the Market-Day on *Wednesday*. *Wrexham* is another of its principal Market-Towns, a pretty Town, and famous for its Market, neat Church, and lofty Steeple.

Flintshire contains about 160000 Acres, and is in Circuit 82 Miles. It hath but three Towns, viz. *Flint*, *St. Asaph*, and *Gairus*; the first so small that it hath no Market. 'Tis a hilly Country, but the Vales are very fertile, and the Inhabitants commonly live to an advanced Age. Its Commodities are small Cattle, Butter, Cheese, Pit-coal, Lead and Millstones. In this Country is *St. Winefred's Well*, so famous for curing Aches, Lameness, and, as some say, for Propagation.

Merionethshire is 180 Miles in Circuit, and contains about 500000 Acres. The County in general is Mountainous, but yet not without plenty of small Cattle, and other Necessaries for the Inhabitants. The chief Manufacture is Cotton-Work. The principal Town is *Harlech*, which hath a pretty good Market on *Saturdays*.

Montgomeryshire is in Compass 94 Miles, and contains 560000 Acres. 'Tis fruitful, though mountainous, and hath six small Market-Towns, but no Manufactures worth Notice.

South-Wales

Contains Brecknockshire, Cardiganshire, Carmarthenshire, Glamorganshire, Pembrookshire, and Radnorshire.

N

Brecknock-

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Brecknockshire is 106 Miles in Circuit, and contains about 620000 Acres, divided into Hills and Valleys; the first but barren, but the latter very plentiful, wholesome, and pleasant. *Brecknock* is the chief Town, and hath a good Trade for Cloathing; it hath two good Markets in a Week, viz. *Wednesdays* and *Saturdays*. The Commodities are Cattle, Fish, and some small Quantity of Otters Furr.

Cardiganshire is 94 Miles in Compass, and contains about 520000 Acres. It is situated on the Bank of the *Irish* Sea, and hath plenty of Corn, Cattle, Fish, Fowl, &c. Of late Years it is become remarkable for its Silver, Copper, and Lead Mines.

Carmarthenshire is one of the most plentiful Counties in all *Wales*, the Air good, and the Soil fertile. It affords plenty of Corn, Cattle, Salmon, Wood, Pit-coal, and the best Lead. 'Tis 102 Miles in Compass, containing about 700000 Acres.

Glamorganshire is a very fine plentiful Country; in the South Part is so fruitful that it is called the Garden of *Wales*. It is 112 Miles in Circuit, and contains about 540000 Acres. *Cardiff* is the County-Town, which keeps two Market-Days weekly, viz. *Wednesday* and *Saturday*.

Pembrookshire is a very pleasant and plentiful Country, for the most part surrounded by the Sea. It is 93 Miles in Compass, and contains about 520000 Acres. This County is famous for a Harbour called *Milford Haven*, and is justly esteemed to be in all respects one of the best in the World. *Pembroke* is the principal Town, whose Market is kept on *Saturday*.

Radnorshire is one of the most barren and unfruitful Counties in all *Wales*. It is in Circuit 90 Miles, and contains about 310000 Acres. The Assizes are usually kept at *Prestain*; but *Radnor* is the Shire-Town, and hath a tolerable Market upon *Saturday*, and *Prestain* hath another on *Wednesday*.

THE

THE CARPENTER'S PLAIN and EXACT RULE.

Of Mensuration of Plains and Solids.

THE several Kinds of Measuring are Three,
viz.

1st, *Lineal*, by some called *Running Measure*, and is taken by a Line, and respects Length without Breadth; the Parts of which are,

12 Inches 1 Foot, 3 Feet 1 Yard, 16 Foot and half 1 Rod, Pole, or Perch.

All Kinds of Ornamental Work, such as Cornice, Frieze, &c. are measured by *Running Measure*.

2^{dly}, *Superficial*, or flat square Measure, is that which respects Length and Breadth; and the Parts are, *viz.*

144 Inches 1 Foot, 72 Inches half a Foot, 36 Inches one quarter of a Foot, 18 Inches half a Quarter of a Foot, 272 Inches and a Quarter one Rod, 136 Foot half a Rod; 1296 Inches, or 9 Foot, one Superficial square Yard.

3^{dly}, *Solid*, or Cube Measure, which respects Length, Breadth, and Depth, or Thickness; and the Parts are, *viz.*

1728 Inches 1 Foot, 1296 Inches three Quarters of a Foot, 864 Inches half a Foot, 432 Inches one quarter of a Foot, and 27 Foot 1 solid Yard.

Superficial Measure.

TO measure Things that have Length and Breadth, such as Board, Glass, Pavement, Wainscot, and Land, is to take the Dimensions of the Length and Breadth, according to the Customary Method used in each Particular; as Board and Glass are measured by the Foot, but Dimensions are taken in Feet and Inches, and the Content given in Feet.

Wainscot and Paving by the Yard, as are also Plastering and Painting, and the Dimensions are taken in Feet and Inches, and the Content given in Yards.

Dimensions of Land are taken by the Pole or Chain, of 4 Poles in Length; all which is taken in square Measure superficial, that is, an Inch, Foot, Yard, or Pole; which is not only sometimes in Length, but also as much in Breadth too; or if it wants of it one way, it must be made up the other.

Of the Square.

The squaring of any Number, is multiplying it into its self, as 12 Inches multiplied by 12 Inches, make 144 Inches square, on the flat. The Square of any Thing is found four several Ways, viz. By Whole Numbers, by Decimals, by Practice, and by Cross Multiplication; in each of which Methods I shall give Examples of Operation.

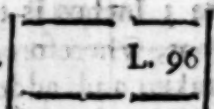
When any Thing is to be measured, it must be considered what Form or Fashion it is of; and then it must be measured according to the several Rules for each Figure.

First, If it be a Square of equal or unequal Sides; that is, one way longer or wider than the other, (as Boards are almost always much longer than they are broad,)

broad) then the Length and Breadth must be multiplied one by the other, which make it square Measure, as was hinted before; and if that Product be divided by its proper Divisor, as 144 is the Divisor for flat or superficial Measure, and 1728 the Divisor for cube or solid Measure; the first being the square Inches in a superficial square Foot, and the other the cubic square Inches in a solid Foot square.

Example.

Admit a Board be 12 Inches broad, and 8 Foot or 96 Inches long; how many square superficial Foot does it contain?

B. 12 |  L. 96

$$\begin{array}{r}
 96 \\
 12 \overline{) 96} \\
 \underline{144} \quad 1152 \quad (8 \text{ Foot.} \\
 1152 \\
 \underline{\hspace{1cm}} \\
 (0)
 \end{array}$$

Here the Length in Inches is multiplied by the Breadth in Inches, and the Product 1152 divided by 144, the square Inches in a Foot, quotes 8 Foot square for the Contents of the Board.

A General Rule for Dispatch.

If the Length of a Board, or Piece of Glass, be given in Feet, and the Breadth in Inches, multiply one by the other, (without any Reduction) and divide the Product by 12, and the Quotient will be the Answer in Feet, and the Remainder will be Parts of a Foot. So the foregoing Example might have been sooner done by dividing 96 the Length, by 12 the Breadth, and it quotes 8 Foot for the Content, as by the former Way.

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Example 2.

Suppose a Board be 14 Foot long, and 15 Inches broad; what's the Content in square Feet?

14 Foot long.

15 Inches broad.

12) 210

Foot 17—6 $\frac{6}{12}$ or $\frac{1}{2}$

So the Answer is 17 Foot and $\frac{1}{2}$. And so for any other Example of this Kind.

Or conciser thus.

14
by 1—3

14
3 In. $\frac{3}{4}$ 3 $\frac{3}{4}$ or $\frac{3}{2}$

Answer 17 $\frac{1}{2}$

Here 3 Inches is the $\frac{3}{4}$ of a Foot, wherefore $\frac{1}{4}$ of 14 is taken and added to 14, and it makes 17 Foot and $\frac{1}{2}$, equal to $\frac{3}{2}$.

If a Board be wider at one End than the other, then take the Breadth in the Middle, or add the Measure of both Ends together, and take the Half for the mean Breadth, which multiply by the Length,

Example.

Suppose a Board to be 120 Inches long, and the narrowest End 10 Inches wide, the broadest End 44 Inches wide; what is its Content in superficial Feet?

Add

Or, The Carpenter's Exact Rule. 271

Add { 34 broadest End.
10 narrowest.

the half — 44

is 22 the Medium.

120 the Length.

144) 2640 (18 Foot $\frac{2}{3}$, Answer.

144

1200

1152

Remains 48 | 4 | 1

or 4 Inches; 48 the
144 | 12 | 3 Remain. is $\frac{2}{3}$ of 144.

Or thus:

Foot In.

10—00 narrowest End.

1—10 the mean Breadth.

In. 10—00

For 10 In. { $6\frac{2}{3}$ 5—00

{ $4\frac{1}{2}$ 3—04

18—04 Answer.

If a Board or Piece of Glas be ever so irregular, it may be measured pretty exactly, by taking the Breadth in 5 or 6 Places, and add the several Breadths together, dividing the Total by the Number of Places, and the Quotient will be the mean Breadth; which multiply by the Length, &c.

Having the Breadth in Inches of any Board, or Piece of Glas, to know how much in Length of that Board, or Piece of Glas, will make a Foot superficial.

N. 4.

Rule.

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Rule. Divide 144 by the Inches in Breadth, and the Quotient will be the Length of that Board that will make a Foot.

Example.

If a Board be 9 Inches broad, what Length of that Board will make a superficial Foot.

Or by the Rule of Three Reverse, Thus,

9)	144	I.b.	I.l.	In.
		If 12 give 12, what 9 broad?		
Inches	16	Answer.	12	

9) 144

Answer 16 Inches.

If a Board be 12 Foot $\frac{1}{2}$ long, and 15 Inches broad; how many square Feet doth it contain?

Vulgarly.

Inches.

150 long:

15 broad:

144) 2250 (15 Foot.

810

90

Multiply 12 Inches 1 Foot.

144) 1080 (7 Inches.

72

4 quarters 1 Inch.

144) 288 (2 quarters or $\frac{1}{2}$

288

(0)

Decimally.

12,5

1,25

625

250

125

Foot 15,625

12

Inches 7,500

4

quarters 2,000

Or, The Carpenter's Exact Rule. 273

By Cross-Multiplication.

Feet. In.

12—6

1—3

12—0

0—6

3—0

1 $\frac{3}{2}$

Per Practice.

Feet. In.

12—7

1—3

12—5

3 Inches $\frac{3}{4}$ 3—1 $\frac{3}{2}$

Facit

15—7 $\frac{3}{2}$

Ans. 15—7 $\frac{3}{2}$

Here the Content is found four several Ways, viz. by multiplying the Inches together, and dividing by 144, &c. The next Work is performed Decimally; the third Method is by Cross-Multiplication; and the last and best is by Practice.

Any of these Methods may be easily understood by the Use of the Arithmetical Part of this Book, except the Method by Cross-Multiplication, which, I think, hath not been shewn; wherefore I shall explain it here.

In the Example, 1 Foot 3 stands under 12 Foot 6; and having drawn a Line, say, once 12 is 12; then I say cross-way, 6 times 1 is 6 Inches; so that Line is 0 Foot 6 Inches: Then cross-ways again, I say 3 times 12 is 36 Inches, the 12's in 36 is 3 times, or 3 Foot 0; so that Line is 3 Foot 0 Inches: Lastly, I multiply the Inches together, saying 3 times 6 is 18, the 12's in 18 once, and there remains 6, or $\frac{6}{12}$, equal to $\frac{1}{2}$, as in the Work.

Proper Directions for Joiners, Painters, Glaziers, &c.

Rooms being generally various in their Forms, take this general Rule in all Cases, viz.

N 5

Take

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Take a Line and apply one End of it to any Corner of the Room: Then measure the Room, going into every Corner with the Line, till you come to the Place where you first began: Then see how many Feet and Inches the String contains, and set it down for the Compass; then take the Height by the same Method.

Glasiers are to take the Depth and Breadth of their Work, and multiply one by the other, dividing by 144; Glass being measured as Board.

Having thus shewn the Methods of casting up Dimensions, I come now to Particulars; and first of

Glasiers Work, by the Foot.

If the Windows be square, multiply the Length by the Breadth, which will produce the Content, as above said.

Example.

A Window glazed by
Cross-Multiplication.

Foot. In.

8—9 high.

7—3 broad:

56—0

2—0

5—3

2 $\frac{3}{4}$

63—5 $\frac{3}{4}$ Answer.

Foot. In.

8—9

7 Foot 3

61—3

3 Inches $\frac{3}{4}$ 2—2 $\frac{3}{4}$

63—5 $\frac{3}{4}$ Answer.

If the Windows are arched, or have a curved Form; no Allowance is made by Reason of the extraordinary Trouble, and waste of Time, expence or waste of Glass, &c. And the Dimensions are taken from the highest

highest Part of the Arch, drawn to the Bottom of the Window, for the Height or Length; which multiply by the Breadth, and the Product will be the Answer in Feet, &c.

Glasiers are often so very nice, as to take their Dimensions, and to measure to a Quarter of an Inch.

Example.

Foot In.

4—3 $\frac{1}{2}$ long.

2 Foot 7 $\frac{3}{4}$ broad.

6 Inches is $\frac{3}{16}$

$1\frac{1}{2}$ is $\frac{3}{2}$

$\frac{3}{4}$ is $\frac{1}{8}$

8-7

2-I $\frac{3}{4}$

 $6\frac{1}{4}\frac{3}{4}$

I $\frac{1}{4}$

11—4 $\frac{3}{4}$ Answer:

Glass is measured by the Foot, as said before ; and the Price of Work is as follows ; viz.

English Glass per Foot ————— 0—5

French and Crown Glass.....1—5

Common Work, Leading included, for every } 0-6
Foot square

Foot square

New Leading old Glafs per Foot ———— 0 — 3.

Common Diamond Squares, each ————○———

Painters Work, by the Yard.

WHEN the Wainscot of a Room is painted, you are to measure round the Room with a Line, (as hinted before) without girting the Mouldings, which are to be measured by a String, and added :

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to the other ; then multiply the Compass by the Height, with the addition of the Mouldings, &c. and you have the Content in Feet and Inches ; which reduced to Feet, bring into Square Yards by dividing by 9.

Example 1.

A Room painted.

Foot. In.

Being 35—8 in Compass } What is the Content.
10 Foot 6 high } in square Yards.

456—8

22—10

9) 479—6

Yards 53—2—6 Answer.

Example 2.

If the Height of a Room painted be 12 Foot 4, and the Compass 84 F. 11 ; what square Yards doth it contain ? Answer 116 Yards 3 F. $3\frac{1}{2}$.

Foot. In.

84—11 Compass

12 F. 4 high.

1015—00

4 $\frac{1}{2}$ 28—03 $\frac{1}{2}$

9) 1047—03 $\frac{1}{2}$

Yds 116—03—3 $\frac{1}{2}$ Ans.

Note, Double Work is allowed in Window-shutters ; Sash-Frames and Mantlepieces are reckoned by themselves, unless the Mantlepieces stand in the Wainscot, and then they are to be measured as plain Work, deducting nothing for the Vacancy.

Price.

<i>Prices.</i>	<i>s. d.</i>
Common coloured, 3 Coats in Oil, <i>per</i> Yard	0—9
On old Colour	0—6
Walnut-tree Colour	1—0
Marble Colour, from 16 <i>d.</i> to	2—0
Sash-Frames, each	1—0
Sash-Lights, each	0—1
Window-Lights, one with another	0—3
Iron Casements	0—3

Joiners Work.

WAINSCOTTING, the Dimensions are taken as in Painting, *viz.* by measuring the Height, (indenting the String where-ever the Plane goes, as well as the Painters do where-ever the Brush goes) and then the Compass; which multiply one into the other, dividing the Product by 9, and the Quotient is the Answer in square Yards.

Example.

What is the Content of a Piece of Wainscoting that is 9 F. 3 long, and 6 F. 6 broad?

Foot. In.

9—3

6 F. 6

55—6

6 In. $\frac{3}{4}$ 4—7 $\frac{3}{4}$

9) 60—1 $\frac{3}{4}$

Yds 6—3 or $\frac{2}{3}$ Answer

The Length and Breadth, being multiplied together, brings it into square Feet; which divided by 9, (the square Feet in a Yard,) produces 6 Yards $\frac{2}{3}$ for the Answer, as *per* Margin.

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By Cross-Multiplication, thus :

Feet In.

9—3

6—6

54—0

4—6

1—6

1 $\frac{1}{2}$

60—1 $\frac{1}{2}$ as before, which divide by 9, &c.

Once more.

There is a Room wainscotted, the Compass of which is 47 Foot 3 Inches, and the Height 7 Foot 6 Inches ; what's the Content in Yards square ? Answer 39 Yards $\frac{1}{2}$.

Feet In.

47—3 Compass

7 F. 6 the Height.

Or thus :

Yds In.

15—9

2 Yds 6

330—9

6 In. $\frac{3}{4}$ 23—7 $\frac{3}{4}$

9) 354—4 $\frac{1}{2}$

Answer 39 Yds $\frac{1}{2}$ or $\frac{1}{3}$

31—6

6 In. $\frac{1}{2}$ 7—10 $\frac{1}{2}$

Answer 39—4 $\frac{1}{2}$

The Prices per Yard.

s. d.

For good Wainscot ————— 6—0

Wainscoting, not finding Stuff, &c. ————— 2—0

Course Wainscoting ————— 1—0

Deal Wainscot, finding Stuff ————— 3—0

Not finding Stuff ————— 1—6

Carpenter

Carpenters Work.

ROOFING, Flooring, and Partitioning, (the principal Carpentry in modern Building) are measured by the Square of 10, that is 100 square Foot.

For Roofing, multiply the Depth and half Depth by the Front; or the Front and half Front by the Depth, and you'll have the Contents.

Dimensions are taken in Feet and Inches.

Example.

How many Squares doth that Piece of Work contain that measures 199 Foot 10 Inches in Length, and 10 Foot 7 Inches in Height? Answer 21 Squares 14 Feet 10 Inches $\frac{3}{4}$.

Operation.

Feet In.

199—10 long.

10 F. 7 high

1998—4

6 $\frac{3}{4}$ 99—11

1 $\frac{3}{8}$ 16—7 $\frac{3}{4}$

21 | 14—10 $\frac{3}{4}$ Answer 21 Squares, 14 Foot 10 Inches $\frac{3}{4}$.

This Work is done by cutting of two Places towards the Right-hand, and the Number on the Left are Squares, &c.

Again.

If a Floor be 49 Foot 7 Inches 4 Parts long, and 26 Foot 6 Inches broad; how many square Feet?

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The Operation:

Feet. In. Parts.

49—7—4 long.

4 and 6 broad.

198—5—4

1190—8—0

99—2—8

24—9—8

13|14—8—4 *Answer* 13 Squares; 14 Foot, 8 In.
4 Parts.

Note, In measuring Roofing, no Deduction is made for Sky-Lights, Chimney-Shafts, &c.

In measuring Flooring, take the Dimensions of the whole Floor at once in Feet, and then measure the Content in superficial Feet of the Vacancy for the Stairs, Hearths, &c. which deduct from the whole Floor, and the Remainder is the true Content ; which bring into Squares as before.

Note, In Partitioning, you must measure the Doors, Door-cases and Windows by themselves, and deduct their Content out of the Whole : Except by Agreement they are included ; and then you must mention in the written Agreement, Doors, Door-cases and Windows included.

There are divers Sorts of Carpenters Work belonging to a Building, viz. Cantaliver-Cornice, Modillion-Cornice, Plain-Cornice, Guttering, Rail and Ballasters, Lintale, Penthouse-Cornice, Timber frontstory, Brest-fommers, Shelving, Dressing, &c. all which are measured by Lineal or Running Measure. There are also Doors and Door-cases, Lantern-Lights with their Ornaments, Balcony-Doors and Cases, Cellar-Doors and Curbs, Columns and Pillasters, Cupeloes, Girders-Ends, &c. all which are valued by the Piece.

Carpenters

Or, *The Carpenter's Exact Rule.* 281

Carpenters Work is done at the following Prices, viz.

	l.	s.	d.
Flooring, finding Boards; the Square	1	15	0
Not finding Boards, from 2 s. 6 d.	0	0	06
Roofing with Oak	2	00	0
Not finding Timber	0	12	0
Partitioning per Square	0	15	0
Not finding Timber	0	07	6
Stairs with Rails and Ballasters complet	1	10	0
Sawing of Oak and Elm per 100 Foot	0	02	6
Fences for Trees	0	02	0

Oak Timber is commonly sold at 40 s. per Tun, (that is 40 Foot square) in the Place; Ash 30 s. and Elm 28 s. per Tun.

Note, *Carpenters measure the Timber Frames of any Building (which they call the Carcase) by the Square of 10 superficial Measure, or 100 square Feet, as hinted before.*

Bricklayers and Tylers Work.

Of Walling.

WALLING is measured by the Rod Statute Measure, being 272 Feet and $\frac{1}{4}$ superficial. The Method of taking their Dimensions is thus: For a Wall round an Orchard, or the like, they measure the Length by a Line, going over the Buttresses; and for the Height, they measure over the Mouldings (pressing the Line into them) even to the Middle of the Coping: They likewise take notice of the Thickness of the Wall, that is, how many half Bricks in Length the Wall is in Thickness; for three half Bricks, that is, a Brick in Length, and one in Breadth, is standard Thickness: And all Walls, whether less
or

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or more, must be reduced to that Thickness, by this Rule, *viz.* Multiply the Product of the Length and Height, by the Number of half Bricks that the Wall is in Thickness; which Product divide by 3, and then that Quotient by 272, (the $\frac{3}{4}$ being generally neglected in vulgar Working) and the Quotient will be Rods, at a Brick and half thick standard Measure.

Example.

Admit the Face of the Wall measure 4085 Feet, and the Thickness be two Bricks and half, or five half Bricks thick; how many Rods doth it contain?

$$\begin{array}{r}
 4085 \\
 \times 5 \\
 \hline
 3) 20425 \\
 \hline
 272) 6808 \text{ (25 Rods, Answer)} \\
 \hline
 1368 \\
 \hline
 (8)
 \end{array}$$

When the Work is wrought Decimally, then you divide by $272 \frac{3}{4}$, or 272.25, which gives the Quotient somewhat less. But the Measuring of Brick-Work may be shorten'd by having the Rod of 16 Foot $\frac{3}{4}$ centesimally divided into 100 equal Parts, with which you take the Dimensions, and the Length of the Wall in those Rods; and 100 parts, multiplied by the Height, give the Content in Rods, of any Wall that is a Brick and half thick. Deduction must be made for Doors, Windows, &c.

A Table to reduce Brick-Work to Standard-Measure, *i. e.* a Brick and half thick.

Brick.

1	Subtract	$\frac{2}{3}$	} Reduces to a Brick and half!
2	Add	$\frac{1}{3}$	
3	} Mult.	2	
$4\frac{1}{2}$		3	
6		4	

Example,

Suppose a Garden Wall to be 254 Foot round, and 12 Foot 7 Inches high, and three Bricks thick; how many Rods doth it contain?

$$\begin{array}{r}
 254 \\
 12 \\
 \hline
 \text{In. } 3048 \\
 6 \frac{1}{2} \quad 127 \\
 1 \frac{1}{2} \quad 21 \rightarrow 2 \\
 \hline
 3196 \rightarrow 2 \\
 2
 \end{array}$$

————— Rods.

$$272) 6392 \rightarrow 4 (23 \text{ &c.}$$

In this Operation, the Aggregate, or Total, is multiplied by 2, because twice 3 is 6, the Number of half Bricks; and that reduces the Work to Standard-Measure, as by the Table above.

Of Chimneys.

This Brick-work is commonly agreed for by the Hearth, and also sometimes by the Rod; and the Method of taking Dimensions is thus: If the Chimney stands singly, not leaning against, or being in a Wall, and worked upright over the Mantletree to the next Floor; it is girt about the Breast for the Length, and the Height of the Story is taken for the Breadth, and the Thickness of the Jaumes for the Thickness. But if the Chimney stands against, or in a Wall, which is before measured with the rest of the Building; then the Breadth of the Breast or Front, together with,

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with the Depth of the two Jaumes, is the Length; the Height of the Story the Breadth, and the Thickness of the Jaumes the Thickness. But if the Chimney stands in the Corner of a Room, and have no Jaumes, then the Breadth of the Breast is the Breadth, the Height of the Story the Length, and the Thickness the Thickness. And for the Shaft, it is commonly girt in the smallest Part, for the Length; and the Thickness of both Sides, for the Thickness; in Consideration of the Widths, Parging, Scaffolding, &c.

Note, There is nothing to be deducted for the Vacancy between the Hearth and the Mantletree, because of the Widths and the Thickening for the next Hearth above.

Arches are measured by taking the Breadth and half the Breadth of the Arch, and add them together; and then to multiply the Total by the Length, for the Content in Thickness of the Arch.

Gable Ends.

Take half the Perpendicular for the Breadth, and the Width of the House for the Length, or half the Width of the House for the Breadth, and the Perpendicular for the Length; which brings the Measure to an Oblong, which is easily measured by multiplying the Length by the Breadth, &c.

Note, A Perpendicular is a down or upright Line in the Work thus: | There are several other Things in Bricklayers Work; as Cornice, Facias, freight Arches, skeen Arches, Hips and Valleys in Tiling, and Water-Courses: All which are measured by the Foot Lineal, or Running-Measure. Also Peers, Pillasters, Rustick Work, &c. which are valued by the Piece.

Prices.

Or, The Carpenter's Exact Rule. 285

Prices.	l.	s.	d.
For Walls, finding Materials	9	00	0 per Rod.
Not finding Materials	1	10	0 ditto
For Tyling, finding Materials	1	05	0 per Square
Not finding Materials	0	05	0 ditto
For Tyling, finding Materials (except Tiles) that is 15 Foot square	0	10	0 per Rod.
For stripping, without taking down	0	05	6 ditto
With taking down	0	07	0 ditto
For Pointing	0	02	0 ditto

Paving.

Pavement for Cellars, Wash-houses, &c. is measured by the square Yard.

Example.

If a Cellar, Wash house, or Court-Yard be paved with Bricks, or pitched with Pebble, being 9 Yards 2 Foot long, and 6 Yards 2 Foot broad; how many Yards square doth it contain? Answer 64 Yards 1 and $\frac{1}{4}$; as by the following Work.

$$\begin{array}{r}
 \text{Yds F.} \\
 9-2 \\
 6-2 \\
 \hline
 54-0 \\
 6-0 \\
 4-0 \\
 1\frac{1}{4} \\
 \hline
 64-1\frac{1}{4} \text{ Answer}
 \end{array}$$

$$\begin{array}{r}
 \text{Yds F.} \\
 9-2 \\
 6 \text{ Yards 2} \\
 \hline
 54-00 \\
 3-08 \\
 3-08 \\
 \hline
 64 \text{ 1-4}
 \end{array}$$

Foot,

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$$\begin{array}{r}
 \text{Foot.} \\
 29 \\
 \underline{20} \\
 9) 480 \\
 \underline{\hspace{1cm}} \\
 \text{Yards } 64 \frac{4}{9} \\
 \underline{\hspace{1cm}}
 \end{array}$$

Here the Answer is found by three different Operations, and the Result of each, to the same Amount; *viz.* by Gross-Multiplication, by Practice, &c.

Slating.

Is valued by the Square of 10 ; in some Places by the Rod of 18 Foot Square, that is 36 square Yards, or 324 Feet.

☞ In Tiling and Slating, where there are Gutters and Valleys, there is commonly an Allowance, which is to take the Length of the Roof all along upon the Ridge, which makes the Gutter double Measure ; which in some Places is allowed, in others not. Sometimes there is an Addition for hollow Ware, that is, Ridge Tiles, Gutter Tiles, Corner and Dormer Tiles ; and here Customs differ : For in some Places they account 1 superficial Foot for every Foot Lineal, or Running Measure ; then 100 Foot Lineal is reckoned a Square. In other Places, for every 100 of such Tiles they reckon 1 Square.

Plastering

Is of two Kinds, *viz.* *First*, Work lathed and plastered, sometimes called Ceiling. *Secondly*, Plastering upon Brick-work, or between the Quarters in Partitioning, by some called Rendering ; both which are measured by the Yard square, as the Joiners and Painters do. In taking Dimensions of Ceiling, if the Room be wainscotted, they consider how far the Cornice bears into the Room, by putting up a Stick perpendicular to the Ceiling, close to the Edge of the uppermost

uppermost Part of the Cornice; and measure the Distance from the perpendicular Stick to the Wainscot; twice which Distance must be deducted from the Length and Breadth of the Room taken upon the Floor, and the Remainder is the true Length and Breadth of the Ceiling: As suppose a Floor is 24 Foot long, and 18 Foot broad, and the Cornice shoots out 6 Inches; deduct a Foot for both Ends, and the Length of the Ceiling is 23 Feet; and the same for the Breadth; it leaves 17 Foot broad; which, (if the Room be square) multiplied together, the Content is 419 Foot 12 Inches, and 46 Yards and a half.

Example.

If the Ceiling of a Room be 19 F. 10 one Way, and 17 F. 6 the other; how many square Yards does it contain?

F.	In.
19	— 10
	4 and 4
—	
79	— 4
	4
—	
317	— 4
	19 — 10
6 Inch. $\frac{1}{2}$	9 — 11
—	

9) 347—1 38 Yds, 5 F. 1 Inch, *Answer.*

Example 2.

How many Yards square is there in a Piece of Plastering that is 47 Foot 4 Inches 7 Parts-long, and 18 Foot broad?

Feet

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F. In. Pts.

47—4—7
 } and 6

142—1—9
 6

9) 852—10—6 (94 Yds, 6 F. 19 In. 6 Pts. *Answer.*

In measuring Partitioning, Doors, Windows, and other Vacancies, there must be an Allowance or Deduction made for there Measure.

Prices per Yard.

s. d.

For every Yard of Plastering, finding Laths, } Nails, &c. —————	1—0
Not finding Laths —————	0—4
For White-washing with Size —————	0—1
Partitioning, finding all Materials —————	0—8

Masons Work.

THE Masons Work, consisting of Stone, is of two Sorts, viz. Superficial and Solid. Pavement, and the Face of stone Walls, Houses, &c. are measured as Brick-work. If the Work have Ornaments, as Capitals, Pillasters, Rails and Ballasters, &c. then they are valued by the Piece.

s. d.

For every Foot of plain Work in Walls, &c. ———	0—3
For plain Cornice, about —————	1—5
For rough stone Wall, with Lime, 16 Foot $\frac{1}{2}$ long, and 1 Foot high, per Rod ———	1—2
Without Lime, per Rod —————	0—3
Paving, digging the Stone, and all Workman-ship, per square Foot —————	0—3

Prices

Prices of Stone and Urns.

Ruff Paving, 1 *d.* per Foot ; Ruff Asher, or Coping, 1 *d.* $\frac{1}{2}$ per Foot ; fine Asher, 3 *d.* per Foot ; Base per Foot 4 *d.* Carbe per Foot 6 *d.* Urns 3 Foot high 1 *l.* 4 Foot high 1 *l.* 10 *s.* five Foot high 2 *l.* and 6 Foot high 3 *l.*

Land Measure.

LAND is measured by the square Pole or Perch, and also by a Chain of 4 Poles in Breadth, and 100 in Length ; and to find its Content (if not regularly square) it is generally contrived into Triangles, as a Piece of Land of 4 Sides (if not square) may be contrived into two Triangles, and Pieces of 5 Sides into 3, and a 6 sided Piece into 4 Triangles.

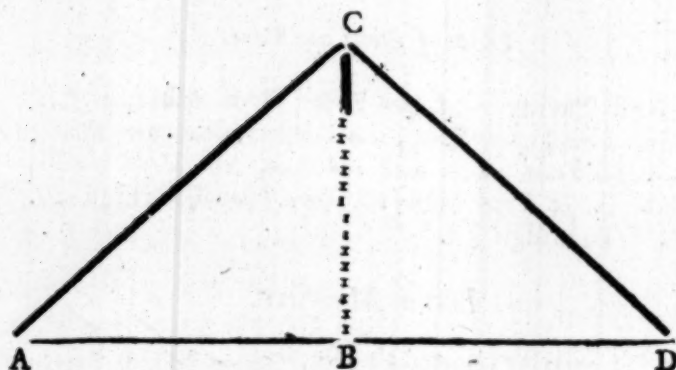
To measure a Triangle.

Admit the longest Side of the following Triangle, viz. *AD* to be 76 Poles in Length, and the Perpendicular or dotted Line *BC*, to be 30 Poles ; multiply 76 (the Base) by 15, the half of the Perpendicular *BC*, and it produces 1140 : Or if you multiply the whole Perpendicular by half the Base, (or longest side) it will produce the same ; which divided by 160, (the square Poles in an Acre) the Quotient gives the Content of that Piece of Land in Acres ; and what remains multiply by 40, and divide by the same Divisor, and it quotes Roods, &c.

Note, *Always the Perpendicular is drawn from the next opposite Angle to the Base, or longest Side ; as in the following Figure.*

O

The



The Operation.

76 the Base.

15 half the Perpendicular.

$$\begin{array}{r}
 16,0 \ 114 \ 0 \quad (7 \text{ Acres } \frac{2}{18} \text{ or } \frac{1}{9}) \\
 112 \ 0 \\
 \hline
 2 \ 0
 \end{array}$$

All other Pieces of Land (for the most part) must be brought into Triangles, and so measured, and their Contents added together.

Example.

Suppose a Plot of Ground contains 35 Poles broad, and 185 Poles long; how many Acres is the Content?

Rule. Multiply the Length in Poles by the Breadth in ditto, and divide the Product by 160, (the square Poles in an Acre) and the Quotient will be the Answer in Acres: And if any thing remains, divide again, either

$$\text{by } \left\{ \begin{array}{l} 120 \\ 80 \\ 40 \end{array} \right\} \text{ and the Quotient is } \left\{ \begin{array}{l} \frac{3}{4} \\ \frac{1}{2} \\ \frac{1}{4} \end{array} \right\} \text{ of an Acre.}$$

The

Or, *The Carpenter's Exact Rule.* 291

The Work.

185 the Length.

35 Poles the Breadth.

$$\begin{array}{r} \hline 925 \\ 555 \\ \hline \end{array}$$

16|0) 647|5 (40 Acres
64

The Content is 40
Acres $\frac{1}{4}$ and 35 Poles,
or almost 40 Acres and
an half.

4|0) 75 Rem. (1 quart.
4

34 Poles Remains.

By the Four Pole Chain.

Example. There is a Plot of Ground that contains
16 Chains and 25 Links in Breadth, and 57 Chains
and 30 Links in Length; what is the Content of that
Piece of Land?

C. Link

57,30 Length.

16,25 Breadth:

$$\begin{array}{r} \hline 28650 \\ 11460 \\ 34380 \\ 5730 \\ \hline \end{array}$$

Acres 93|11250 cut off 5 Places.

4

No Roods ,45000
40

Answer.

Poles 18|00000 93 A. 0 R. 18 Poles.

O 2

Note,

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Note, 4 Roods or Rods is 1 Acre, 40 Poles 1 Rood or Rod, 1 Rood or Rod 1 quarter of an Acre.

Note also, *Gunter's Chain* contains 4 Statute Poles in 100 Links ; so that any Number of Chains is no more than so many 100 Links ; as 4 Chains is 400 Links, and 6 Chains 600 Links, &c. 160 Statute Poles is an Acre, each Pole being 16 Foot and half ; therefore, in a square Chain there are 16 square Poles ; and if you divide 160 (the square Poles in an Acre,) by 16, (the square Poles in a Chain) the Quotient is 10, the square Chains in an Acre.

A square Chain contains 10000 square Links, (or 100 multiplied by 100) and therefore it follows consequently, that an Acre contains 100000 square Links.

To reduce Statute to Customary Measure.

According to a Statute made in the 33d of *Edward* the First, and another in the 25th of *Queen Elizabeth*, a Statute Pole is 16 Foot and half long ; (as said before) but in divers Parts of *England* there are used Poles of 18, others of 21, and some of 24 Foot long, called Customary Measure, being in Use according to the Humour or Custom of the Place where they are taken. To turn therefore one Sort of Measure into the other, admit Statute Measure to be turned into Customary, do thus : Multiply the Number of Acres, Roods, and Poles Statute Measure, by the square half Yards, or square half Feet in a square Pole of Statute Measure, and divide the Product by the square half Yards, or square half Feet contained in a Pole of the Measure Customary, and the Quotient gives the Answer in the latter, in Acres, Roods, &c.

Example.

Or, The Carpenter's Exact Rule. 293

Example. In 172 Acres Statute Measure, how many Acres of 18 Foot to the Pole or Perch?

Acres

172 Statute Measure.

121 half Yards in a Statute Pole.

Product 20812 (144 Acres $\frac{72}{144}$ Customary Measure

144

&c.

In a Statute Pole are 11 half Yards, which squared make 121 square half Yards: And in a square Pole of 18 Feet are 144 square half Yards, *&c.* For the Remainder, work as before, *viz.* by multiplying it by 4, *&c.* and the next Remainder by 40, *&c.* as spoke to before. So that the Answer is, that 172 Acres Statute Measure make, by the foregoing Operation and Direction, 144 Acres, 2 Roods, and 4 Poles Customary Measure, of 18 Foot to the Pole.

One Example more per Contra.

In 543 Customary Acres of 18 Foot to the Pole, how many Acres of Statute Measure, being 16 Foot and half to the Pole?

543 Customary.

144 Square half Yds in a Customary Acre.

2172

2172

543

121) 78192 (646 Statute Acres.

796

55, *&c.*

O 3

the

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The Remainder 26 multiplied by 4, produces 104, which are not a Rood ; which multiplied by 40 gives 4160 ; which divided by 121, quotes 34 Perches, and 46 remains. So the Answer is, that 543 Customary Acres, of 18 Foot to the Pole, makes 646 Acres, 0 Roods, and 34 Poles, $\frac{46}{121}$ of a Pole.

Note, Customary Acres, as well as Statute Acres, contain 160 square Poles or Perches ; the Excess of Bigness is by the Bigness of the Pole.

Solid Measure

IS that of Timber, Stone, Digging, and Liquids : and the Rule for Working is to multiply the Length and Breadth together, and then that Product by the Depth or Thickness, and the last Product will be the Content in Cubick Inches ; which if Timber or Stone, divide by 1728, (the cubick Inches in a F. solid) and the Quotient gives the Content in solid F.

Example. If a Tree be 16 Foot long, and 18 Inches square ; how many solid Feet doth it contain ?

$$\text{Multip.} \begin{cases} 18 \\ 18 \end{cases}$$

324

16

12

192 Length.

324 Breadth & Thickness.

768

384

576

1728) 62208 (36 Feet.

5184

10368

(0)

Decimally

	Decimally	By Practice
Square	$\begin{cases} 1,5 \\ 1,5 \end{cases}$	$\begin{array}{r} 1-5 \\ 1-6 \end{array}$
	225 Breadth	1-6
	16 Length	6 In. $\frac{1}{2}$ 9
	36,00 Answer.	2-3
		4 and 4
		9-0
		Foot 36-0 Answer.

Solid Feet.

Note, 40 of round } Timber is a Tun or
 50 of hewn } Load.

Divisors

- 8172 for Timber or Stone.
- 27 for Digging.
- 282 for Beer.
- 231 for Wine.

Example 2.

Suppose there is given a square Piece of Timber whose Breadth is 2,25, and Thicknefs 1,64 Feet, and Length 36,5 Feet, how many solid Feet are contained therein ?

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$$\begin{array}{r}
 2,25 \text{ Breadth.} \\
 1,64 \text{ Thickness.} \\
 \hline
 900 \\
 1350 \\
 225 \\
 \hline
 36900 \\
 36,5 \text{ Length.} \\
 \hline
 184500 \\
 221400 \\
 110700 \\
 \hline
 134,68500 \text{ Answer } 134 \text{ solid Feet.} \\
 \hline
 \end{array}$$

The common Way of taking $\frac{1}{4}$ of the Compass for the true Square of it is erroneous, and gives the Solidity somewhat less than the true Content : But the true Way is to multiply half the Diameter by half the Compass, and then that Product multiply by the Length, which divide by 1728, and the Quotient is the Content. If you cannot come to measure the End of the Piece, you may know the Diameter by this Proportion, *viz.* as 22 is to 7, so is the Compass of the Diameter. Or you may find the Square of a round Piece of Timber by this Rule, *viz.* multiply by the Inches of the Compass, and cut off 4 Figures to the Right-hand.

$$\begin{array}{r}
 2821 \\
 \text{Inch. } 66 \text{ the Compass.} \\
 \hline
 16926 \\
 16926 \\
 \hline
 18|6186 \text{ Answer. } 18 \text{ Inches.} \\
 \hline
 10000
 \end{array}$$

Having

Having the Breadth and Depth of a Piece of Timber or Stone, to know how much in Length of it will make a solid Foot ; multiply one by the other, and let it be Divisor to 1728, thus :

Inches

24 broad

18 thick

192

24

432) 1728 (4 Inches in Length, Answer.

1728

And thus you make a Table to serve all Breadths and Depths, by which, much Labour may be saved in multiplying and dividing, and yet measure any Piece of Timber thereby very exactly.

The usual Way for tapering Timber is by this Method, *viz.* take the Dimensions in the Middle, and multiply that by the Length ; which, though somewhat false, yet, if done at several Lengths, as at every 5 or 6 Feet, it will be very near.

Digging

IS measured by the solid Yard of 27 Foot ; that is, 3 times 3 is 9, and 3 times 9 is 27 ; by which are measured Vaults, Cellars, Clay for Bricks, &c. Other Things are measured by the Flore of 324 solid Feet.

Example.

If a Vault or Cellar be digged 9 Foot deep, 4 Foot $\frac{1}{2}$ long, and 3 Foot 9 Inches broad ; what is its Content in solid Yards ?

Q 5

Foot

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Foot

4 $\frac{1}{2}$ long
9 deep

40 $\frac{1}{2}$
3 F. 9 broad

6 Inches $\frac{1}{2}$
3 $\frac{1}{2}$ of 6

12 1 $\frac{1}{2}$
20 $\frac{1}{4}$
10

27) 151 $\frac{3}{4}$ (5 Yards 16 Foot $\frac{3}{4}$.

(16)

Example 2.

How many Yards of Digging will there be in a Vault that is 25 F. 4 long, 15 F. 8 broad, and 7 F. $\frac{1}{2}$ deep.

76—0
5

380—0
8—5 $\frac{1}{4}$
 $\frac{2}{3}$ 8—5 $\frac{3}{4}$

326—10 $\frac{1}{2}$
7 F. $\frac{1}{2}$ deep

2778—1 $\frac{1}{2}$
 $\frac{1}{2}$ 198—5 $\frac{1}{4}$

27) 2976—6 $\frac{3}{4}$ (110 Yards, 6 Foot, and 6 Inches $\frac{3}{4}$, Answer.

27

(6)

Example

Or, The Carpenter's Exact Rule. 299

Example 3. There is a Mote that is 648 Foot long,
24 Foot broad, and 9 Foot deep ; how many Flores ?

$$\begin{array}{r}
 648 \text{ long} \\
 24 \text{ broad} \\
 \hline
 2592 \\
 1296 \\
 \hline
 15552 \\
 9 \\
 \text{divide by } 324) 139968 \text{ (432 Flores, Answer.} \\
 \text{Etc.} \\
 (0)
 \end{array}$$

Solid Bodies being frequently painted, it is necessary to know how to find their Superficiality. To find the superficial Content of a Square, or many sided, or round Pillar ; multiply the Sum of the Sides or Circumference, by the Height in Feet ; and the Product divide by 9, and the Quotient will be square Yards.

Of a Globe.

Multiply the Circumference in Feet by itself, and then that Product by this Decimal ,0354, and this last Product will be the Content in Yards.

Note, A solid Yard square of Clay will make about 7 or 800 of Bricks ; and the Price of making is 7 or 8s. a Thousand. 3 Bags (or Bushels) and half of Lime, and half a Load of Sand, to laying 1000 Bricks.

500 Bricks
 1000 Plain Tiles } make a Load.
 25 Bags 1 C. of Lime.

IT may not here be improper, as well for refreshing the Memory, as for improving the Understanding, and forming the Mind with proper Notions and Ideas of Measuring, to give a short Repetition by demonstrative Geometrical Figures, to explain what hath been verbally and arithmetically before expressed.

And first for *Planometry*, or *superficial* or *flat Measure* ; some of which is measured by the Foot square ; as are Boards, Glass, Marble, Freestone and Pavements. Dimensions are taken in Feet and Inches, and the Content given in square Feet ?

Example 1.

Suppose there is an Oblong or long Square, let it be Board, Glass, or Pavement, &c. that contains on the longest Side (or the Length) 24 Feet and half, and the shortest Side (or Breadth) 14 Foot and $\frac{3}{4}$; as in the following Figure, viz.

14 F. $\frac{3}{4}$

F. 24 $\frac{1}{2}$

Area or Content is
349 F. 125.

14,25 Breadth.

24,5 Length.

7125

3700

2850

349,125

Rule. Multiply the Length by the Breadth, and cut off as many Places to the Right-hand as there are Decimals in the Length and Breadth.

Example

Example 2.

Suppose a Board or Piece of Glas be in the Form of *Figure the First*, called a Rhombus, that is in the shape of a common Pane of Glas, or Diamond square.

Rule. To measure which, multiply the Breadth *AB*, by the Length of any of the Sides, (for they are all equal) and cut off as many Places to the Right-hand as there are Decimal Places in both Multiplicand and Multiplier, as hinted before : As suppose the Breadth *AB*, 8 Foot 38 Parts, and the Length of the Side to be 8 Foot 52 Parts ; then the Work will appear thus :

F. P.
8,52
8,38
6816
2556
6816
71,3976

Here the Multiplication is as in Whole Numbers, and the Content or Answer is found to be 71 square Feet, and $\frac{3976}{10000}$ ten thousandths of a Foot, or 4 Inches $\frac{1}{4}$.

3976 is separated by a Comma, as above directed, and are so many 10000 Parts of a Foot, as in the Work and Margin expressed.

Example 3.

Again, admit a Piece of Measurement to be of the Form of *Figure the Second*, called a Rhomboides ; its Length 17 Foot 25 Parts, and its Breadth 8 Foot 58 Parts.

f. p.

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f. p.

17,25 Length.

8,58 Breadth.

The forementioned figure hath its opposite Sides equal and its opposite Angles alike.

13800

8625

13800

148,0050

Answer, the Content is 148 Feet.

Once more.

Suppose a Board, Piece of Glass, Pavement, or Piece of Land to represent, or be in the Form of a Triangle, or three-corner'd figure, expressed as in the Shape of *Figure the Third*. Every Triangle is half a long Square, whose Length and Breadth is equal to the Perpendicular and Base.

Note, The dotted Line is the Perpendicular, the bottom Line the Base, and the Line from the Top of the Perpendicular to the Left Angle of the Base, is called the Hypothenuse.

The measuring of a Triangle hath been already shewn, and therefore I shall desist speaking any further thereto.

The *Fourth Figure* is called a Trapezium, and consists of 4 Sides : This Figure, before it can be measured, must be divided into Triangles, thus ; viz. by 2 Lines drawn from one Angle or Corner, to the Angle opposite to it, as in the Figure.

Example 4.

Suppose the Dimensions of the Trapezium before described to be, viz. the Base 16 F. 67 ; the one Perpendicular 12 F. 50, and the other 9 F. 68 (as in *Figure 5.*) what's the Content ?

The

The Operation.

	F. P.	
One Perpendicular	12,50	} add
The other	9,68	
The Sum is	22,18	
The half Sum is	11, 9, which	
multiply by the whole Base	16,67	
produces	184,8703	

which is 184 Feet, and $\frac{8703}{10000}$ of a Foot, equal to 10 Inches and half.

Note, If two Sides of a Trapezium are parallel, that is, the Lines equal; then add them together, and half the Sum multiplied by the nearest distance between those two Sides, give the Content. Or if you measure it in the Middle between those two Sides or Lines that are of equal Length, the Answer will be the same.

Note also, Painting, Plastering, or any other irregular Pieces of Measurement, if in the Form of a Triangle, or if not, if divided as above, may be measured *ut supra*; and brought into Yards (if the Content is to be so given in) by dividing by 9, as before shewn.

Glaziers Work

May it be done thus; Multiply the Length in Inches and Parts, by the Breadth in Inches and Parts, and separate for the Decimals (if any) as before shewn.

Example.

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Example.

A piece of Glasing
and In. pts.
29,5 long
7,0 broad

144) 206,50 (1,5 So the Content is 1 f. 5.
144 and $\frac{1}{8}$ of an Inch.

12) 62 (5
60

(2)

Here, after the two places are separated by a Comma, the Remainder is divided by 144, and then what remains by 12, &c.

Or thus, as if Shillings and Pence.

s. d.

2—5 $\frac{1}{4}$
7

FI

12) 17—0 $\frac{1}{4}$ (1,5 $\frac{1}{4}$ Answer.

An expeditious Way.

When the Length of any Superficies, either of Board or Glass, is given in Feet, and the Breadth in Inches, then only multiply the one by the other, and divide by 12, and the Quotient will be the Answer in Feet, and the Remainder will be the Parts of a Foot; as hath been spoken of before. *Example.*

Admit a Board to be 15 Foot long, and 12 In. broad,
12 Inches broad,

12) 180 (15 Foot Answer;

Of Regular Figures.

There are four Kinds, namely, the Pentagon of five Sides, the Hexagon of six, the Heptagon of seven, and the Octogon of eight Sides; all which derive their Names from the *Greek*, &c.

To measure any of these Bodies, is by dividing them into Triangles; which is done by drawing Lines from the Centre of the Figure to every Angle or Corner; then from the Centre to the Middle of any of the Triangle's Sides, draw a Line; which Line is the Perpendicular. Having the Perpendicular and Base of any of these Triangles, find the Content of one Triangle, and that multiplied by the Number of Triangles, finds the Content of the Body, or Figure.

Note, To find the Centre or Middle of any Regular Figure of an even number of Sides, draw a Line from one Angle or Corner to its opposite, the Middle of which is the Centre; But if your Figure have any odd number of Sides, as 5 or 7, &c. draw a Line from any Angle to the Middle of the Side opposite, the Middle of which side is the Centre.

Of Solid Measure.

Solid or Cube Measure hath been already defined, (as well as Superficial Measure,) some of the Figures of which are number'd 6, 7, and 8.

To measure a Solid in form of a Cube, which hath Length, Breadth, and Thickness all equal, you must multiply these into themselves, and the last Product gives the Solidity or Content, either of Wood or Stone. A Cube hath 6 sides, and in shape like a Dye.

Example

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Example on the Cone, Decimally, without dividing by 1728.

$$\begin{array}{r}
 2,5 \quad \left. \vphantom{\begin{array}{l} 2,5 \\ 2,5 \end{array}} \right\} \text{the Diameter} \\
 2,5 \\
 \hline
 12,5 \\
 50 \\
 \hline
 6,25 \text{ the square of dicto} \\
 ,785 \\
 \hline
 3125, \text{ \&c.} \\
 \hline
 4,90625 \\
 3,5 \text{ the } \frac{2}{3} \text{ of the Altitude.} \\
 \hline
 2453125, \text{ \&c.} \\
 \hline
 17,171875 \text{ the Content in solid feet.} \\
 \hline
 \hline
 \end{array}$$

The Cone is measured by multiplying the superficial Inches at the bottom or base thereof ; the Product whereof, multiply by one third of the Inches in the Length, and that Product is the solid Quantity in Inches ; which Inches divided by 1728, and the Quotient gives the Answer in solid Feet.

This Method may serve for Tapering Timber, or of any other thing of the Shape represented in Figure 8, viz. that of a Sugar Loaf.

To measure the Pyramid.

Rule. Multiply the side of the Base or Bottom into itself, and that Product by one third of the perpendicular Height, and the last Product will be the Content in solid feet : Or one third part of the Area at the Base, multiplied by the whole Altitude, gives the Content also.

Examples

Examples of both Ways.

Suppose there is given a square Pyramid (or Figure like a Spire Steeple) the side of whose Base is 4 foot and half, and the perpendicular Height 18 feet; what is the solid Content?

$\begin{array}{r} 4,5 \\ 4,5 \\ \hline 225 \\ 180 \\ \hline 20,25 \end{array}$	$\begin{array}{r} 6,75\frac{2}{3} \text{ of } 20,25 \text{ the Area at the} \\ 18 \text{ the whole Height (Base} \\ \hline 5400 \\ 675 \\ \hline 121,50 \text{ Answer } 121,50 \text{ as before;} \end{array}$
$6\frac{2}{3} \text{ of the } \sqrt{\hspace{1cm}}$	
Altitude	
$121,50 \text{ Answer } 121 \text{ feet \& } ,50 \text{ or } \frac{1}{2}.$	

When one side of the Base is longer than the other, as admit one to be 2 f. $\frac{1}{2}$, and the other 1 f. $\frac{1}{2}$; then multiply the Length of the Base by the breadth, and that Product by one third of the height, as before.

To measure the Frustrum or Segment, i. e. a Piece or Part of a Pyramid or Cone.

Rule. Suppose the whole Content to be (as above) 121,50; then the Segment being measured by itself, gives 56,25; which subtract from 121,5 and the Remainder will be the Content of the Frustrum, thus:

$$\begin{array}{r} 121,5 \\ 56,25 \\ \hline 65,25 \end{array}$$

So that the Content of the Frustrum is 65 f. ,25 or $\frac{1}{4}$.

of

*Of a Circle.**Figure the Seventh.*

A Circle is contained under one Line, called the Circumference or Periphery; as *ABC*. All right Lines drawn from the Centre *E* to the Circumference, are equal, and called Rhadius's, or half Diameters: and the long Line through the Centre from *A* to *C*, is the Diameter.

To divide a Circle in 6 equal parts, extend the Compasses to half the Diameter, as from *A* to the Centre *E*, and that Extent will do it.

A Circle represents the Globe of the Earth, or terrestrial Sphere; which if it be divided into 360 parts, they are called Degrees; each of which, on the Face of the Earth, is accounted 60 Miles; so that 360 multiplied by 60, produces 21600 Miles from the Circumference, according to this Verse:

*Geography the World's vast Compass files
Twenty one Thousand and Six Hundred Miles.*

Half the Semi-circle of the Circle, that is, half of the half of the Circle, is called a Quadrant, or Quarter.

If the Diameter of a Circle be 7 Inches, or 7 Foot in Length; then is the Periphery or Compass 22 Inches, or 22 Foot about.

Example 1.

If the Compass of a Circle be 66 Foot, what is the Diameter?

Multiply 66 by 7, and divide the Product by 22, and the Quotient gives the Diameter.

$$\begin{array}{r}
 66 \\
 7 \\
 \hline
 22) 462 \text{ (21 Foot, Answer.} \\
 44 \\
 \hline
 22 \\
 22 \\
 \hline
 (0)
 \end{array}$$

Example 2.

If the Diameter be 21 Inches, what is the Circumference?

The Operation is just the Reverse, viz.

$$\begin{array}{r}
 21 \\
 22 \\
 \hline
 42 \\
 42 \\
 \hline
 7) 462
 \end{array}$$

Inches 66 Answer.

If a Globe be 31 Inches $\frac{3}{7}$ in Compass, what is the Diameter?

Work'd Fractionally thus:

Say 7 times 1 is 7, and 3 the Numerator makes 10; 0 and carry 1; then 7 times 3 is 21, and 1 carried is 22: So the Product is 220 the Dividend; which divide by 22, agreeable to the Proportion before mentioned.

Example

Example of Operation.

$$\begin{array}{r} 31 \frac{3}{7} \\ \underline{7} \\ 22) 220 \end{array} \quad (10 \text{ Answer, } 10 \text{ Inches Diameter.}$$

(o) *Example 3.*

Contra. If a Circle be 10 Inches Diameter, what is the Circumference ?

The Work.

$$\begin{array}{r} 22 \\ 10 \\ \hline 7) 220 \end{array}$$

31 $\frac{3}{4}$ Answer and Proof.

To measure the superficial Content of a Circle, either in Inches or Feet.

Rule. Multiply half the Periphery or Compass, by half of the Diameter, and the Product will be the Content.

Example 4.

Admit a round Table to be 14 Inches Diameter, and 44 ditto in Compass ; what's the superficial Content in square Inches ?

22 half the Compass.
7 half the Diameter.

154 Answer.

Or if the Diameter be squared or multiplied into itself, and that Product multiplied by 11, and the result thereof divided by 14, gives the same Content.

Example.

Or, The Carpenter's Exact Rule. 311

Example.

$$\begin{array}{r}
 14 \text{ multiplied} \\
 \text{by } 14 \\
 \hline
 \text{produces } 196 \\
 \text{multiply by } 11 \\
 \hline
 196 \\
 196 \\
 \hline
 \end{array}$$

divide by 14) 2156 (154 Quotient.

Etc. as before.

Figure the Tenth.

To measure half a Circle or round Table, viz.

Rule. Square the Semidiameter CD, and that Product multiply by 22, and divide by 14; so the Answer is 77 square superficial Inches.

Inches.

$$\begin{array}{r}
 7 \\
 7 \\
 \hline
 49 \\
 22 \\
 \hline
 98 \\
 98 \\
 \hline
 \end{array}$$

14) 1078 (77 Answ.

To measure the Quarter or Quadrant of a Circle.

Rule. Multiply the Line CB into itself, and proceed as before; but multiply the first Product by the half of 22, viz. 11.

$ \begin{array}{r} 3\frac{1}{2} \\ \hline 10\frac{1}{2} \\ \hline 12\frac{1}{4} \\ \text{By } 11 \\ \hline 14) 134\frac{3}{4} \text{ (9 In. } \frac{1}{2} \frac{7}{14} \\ \underline{126} \\ \text{\&c.} \end{array} $	<i>Decimally.</i> $ \begin{array}{r} 3,5 \\ \hline 14) 12,25 \text{ (} \\ \underline{12,25} \\ 14) 13475 \text{ (9,62} \\ \underline{126} \\ \text{\&c.} \end{array} $
---	---

The Decimal Work produces $\left\{ \begin{array}{l} 9, 62 \\ \hline 100 \end{array} \right\}$ equal to the same Answer as the other, $\left\{ \begin{array}{l} \text{half an In.} \\ \hline \text{and } \frac{7}{14} \text{ or} \end{array} \right\}$ viz. $\frac{9,62}{100}$ half of half an Inch.

By these Methods, may a Piece of Timber that is half round, or a quarter round, at the Base or End, be measured ; that is, by multiplying the square Inches at the End by the Inches of the Length.

Of Timber Measure.

WHEN at any time you would know the Content of any Piece of Timber by Vulgar or Natural Arithmetick, observe what follows, *viz.* The Tree being girted, and one-fourth Part taken for the Side of the Square ; multiply the Length of the Side of the Square in Inches into itself, and that Product by the Length in Feet ; which last Product divide by 144 : (But if you multiply by the Length in Inches, then your Divisor must be 1728) and if any thing remains, divide such Remainder by 12, and the Quotient will be the odd Inches.

Example.

Example.

Suppose a Piece of Timber 15 Foot long, and a Quarter of the Girt 42 Inches; what is the Content of that Piece? The Work :

$$\begin{array}{r} 42 \text{ Inches the side of the} \\ 42 \text{ Square.} \\ \hline 84 \\ 168 \end{array}$$

$$\begin{array}{r} 1764 \\ 15 \text{ Foot the Length:} \\ \hline \text{F. I.} \end{array}$$

144) 26460 (183,9 Answer:

$$\begin{array}{r} 144 \cdot \cdot \\ \hline 1206 \\ 1152 \end{array}$$

$$\begin{array}{r} 540 \\ 432 \end{array}$$

$$\begin{array}{r} 12) 108 (9 \text{ Inches.} \\ 108 \end{array}$$

(0)

Note. In this Example, 1764 is multiplied by 15 in one Line.

P

But

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But the foregoing Example may be worked shorter by Decimals, thus :

Squared { 3,5 the Side of the Square 42 Inches
3,5

175

105

12,25 the Product are Feet

15 Feet the length

6125

1225

183,75 the Content, viz. 183, $\frac{75}{100}$ or $\frac{3}{4}$ as before.

Admit a piece of Timber or Stone be 9 Inches thick, 15 Inches broad, and 12 Foot long ; what is the Content in solid Feet ? See Figure the 11th.

15 broad

9 thick

135

12 length

144) 1620 (11 Foot 3 Inches, or

144

180

144

12) 36 (3

(0)

Of Board-Measure.

WHENEVER the Breadth is given in Inches, and the Length of the Board in Feet; then only multiply one by the other, and divide the Product by 12, and the Quotient will be the Answer in square Feet: But if the Breadth and Length be given both in Inches, then multiply one by the other, and divide by 144, and the Quotient will be the Answer in square Feet.

Example 1.

Suppose a Board (or any other thing of flat Measure) be 15 Inches broad, and 16 Foot long; what is the Content in square Feet?

192 length in Inches 15 breadth in Inches 144) 2880 (20 Feet 288 (9) 12) 240 20 Answer 20 Feet	15 breadth in Inches 16 length in Feet 90 15 12) 240 20 Answer 20 Feet
---	---

Here the Example is wrought both ways, as above-said, and the Answers are both alike.

Example 2.

Suppose a Board be 8 Inches and $\frac{3}{4}$ in Breadth, and 16 Foot long; what is the Content in square Feet? The Work follows.

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$8\frac{1}{4}$ Breadth
4 and by 4

$$\begin{array}{r} 33 \\ 4 \\ 12) 132 \end{array}$$

In this Example, I multiply by 4 and 4, the component parts or Ratio's of 16 the Length.

Answer 11 Foot.

Example 3.

Again, Admit a Board 17 Inches $\frac{3}{4}$ broad, and 28 Foot long, what is the Content?

$$\begin{array}{r} 17\frac{3}{4} \\ 7 \text{ and } 4 \\ 124\frac{3}{4} \\ 4 \\ 12) 497 \end{array}$$

This Example is multiplied by 7 and 4, the Ratio's of 28 the Length.

Answer 41 Foot $\frac{1}{2}$

Once more by the other way. Suppose a board be 32 Inches broad, and 37 Foot or 444 Inches in Length; what is the Content? 4 and 8 breadth

$$\begin{array}{r} 1776 \\ 8 \\ 44) 14208 \text{ (98 Foot and half)} \\ 1296 \cdot \\ 1248 \\ 1152 \\ (96) \end{array}$$

Or, The Carpenter's Exact Rule. 317

The Parts of a superficial Foot, or 144 square Inches.

Inches

72 half a Foot

108 three quarters

126 three quarters and half a quarter

36 a quarter of a Foot

18 half a quarter

In the last Work, I multiply 444, the Inches of the Length, by 4 and 8, the component Parts of 32, the Inches of the Breadth; and then divide the last Product by 144, and the Answer is 98 Foot, and 96 square Inches remain, which is half a Foot and half a quarter of a Foot, and 6 square Inches.

Mr. *Darling*, in his *Treatise of the Carpenter's Rule*, hath with great Pains (and no doubt with as great Care) given a 'great many Tables for the Answer of sundry Dimensions in Board and Timber Measure; but he measures best, that doth it experimentally by Arithmetick, by those short and easy Rules before and hereafter mentioned, and takes not things upon trust; for tho' Tables may be Right, so perhaps they may be also Wrong, (for Error is endless;) and then to be wholly guided by such Tables, it would be of sad and very pernicious Consequence; and if the Artist is ignorant of Arithmetick, he will be bewildered and plunged into inextricable Difficulties. — I must confess, that Tables are of considerable help in case of Expedition; but then you must be very well acquainted with them; otherwise I can in much less time cast up the Dimensions, than you shall be in finding out your several Numbers, and adding or subtracting them, &c. No Man that is wise, ought to depend upon any Table for his Government, till he hath pro-

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ved the Truth of every Line; and he that is able to do that, is capable of making any Table for his own Use; which if he takes care that it be correct, he is well provided, and need not be led into Error or Confusion by false Tables.

Timber or Solid Measure.

DIMENSIONS here are considered in Breadth, Thickness, and Length; the Breadth and Thickness are commonly called the Square; which multiplied one in the other, and that Product multiplied by the Length in Inches, and divided by 1728, the Quotient of that Division is the Answer in solid Feet.

Example.

Suppose a Piece of Timber be 15 Inches square; that is, 15 Inches broad, and 15 Inches thick, and 16 Foot, or 192 Inches long; what is the Content of that Piece of Timber or Stone (or any other thing that is to be measured by Cube or Solid Measure) in solid Feet?

15 Broad

15 Thickness

75

15

1728) 43200 (25 Feet

225

3456

192

8640

450

8640

2025

(0)

225

43200 solid In.

So the Answer is 25 Foot of solid Timber in such a Piece, or in such a Stone of such Dimensions, —

Or if you multiply the Content of the Square by the Length in Feet, and divide that Product by 144, the Quotient will give the same Content or Answer as before. See the following Work.

$$\begin{array}{r}
 15 \\
 15 \\
 \hline
 225 \text{ the Square.} \\
 16 \text{ the Length.} \\
 \hline
 \end{array}$$

144) 3600 (25 solid Feet the Content.

A second Example in this, may be after the second Example in Board-Measure. That is, suppose a Piece to be 8 Inches one Quarter Square, and the Length 192 Inches; what is the Content?

$$\begin{array}{r}
 1728) 13068 \text{ (7 Answer} \\
 12096 \\
 \hline
 \end{array}$$

972

Answer, 7 Foot and half, and 108 Cubick Inches,

Decimally,

8,25

68,0625 Square Inches

8,25

192 Length in Inches

4125

1361250

1650

6125625

6600

680625

68,0625

13068,0000

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Another Example. Suppose a Piece of Timber to be 17 Inches three quarters Square, and 28 Foot long, what is the Content ?

17 Inches three quarters multiplied into its self, the Product will be 3150625 ; which multiplied by the Length 336, the Product will be 105861, cutting off the four Cyphers, and the Answer will be 6161 Foot, and 453 remains, being one fourth of a Foot and 21 Inches, as may be gathered by the parts following.

The Parts of a solid Foot, being 1728 Inches.

Half a Foot	864 Inches
A Quarter of a Foot	402 Inches
Three Quarters of a Foot	1296 Inches
Half a Quarter of a Foot	216 Inches

How to know in superficial or flat Measure, having the Breadth, what Quantity in Length of that Board or Piece of Glass will make a Foot square.

Rule. Only make the Breadth in Inches Divisor to 144, the square Inches in a superficial Foot, and the Quotient will be the Length in Inches that will make a Foot.

Example.

If a Board be 8 Inches broad, what Length of that Board (or Piece of Glass) will make a Foot ?

$$\begin{array}{r} 8 \overline{) 144} \end{array}$$

Answer, 18 Inches, or 1 Foot and half.

Again, If a Board be 16 Inches broad, what Length of it will make a Foot ?

$$\begin{array}{r} 16 \overline{) 144} \end{array} \quad (9 \text{ Inches})$$

Answer, 9 Inches.

This

This Method is manifestly true, from this Observation; that a Board a Foot or 12 Inches broad, will require a Foot or 12 Inches in Length to make it exactly square, or 144 Inches: And this is known without Operation. By this Method may a Table of Board or Glass Measure be proved.

Likewise in solid Measure to know what Length of the Piece of Timber will make a Foot solid, you must make the Inches square, Divisor to 1728, (the square Inches in a Foot solid;) and the Quotient will be the Answer in Inches of Length, that will make a Foot solid.

Example.

If a Piece of Timber be 8 Inches square, what Length of it will make a Foot?

64) 1728 (27 Answer, 27 Inches, or
128 2 Foot 3 Inches in
 Length.

448

448

(0)

Here the Square of 8 is 64, &c.

Again, Suppose a Piece be 18 Inches square, what Length will make a Foot? Answer, 5 Inches and one third.

The Square of 18 is 324) 1728 (5 $\frac{2}{3}$ equal to $\frac{5}{3}$
1620

(108)

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Once more, Admit a Piece of Timber be 2 Foot 2 Inches square, *i. e.* 26 Inches square, which is 676) 1728 (2 Inches $\frac{376}{26}$ or $\frac{1}{2}$ Answer.

&c. 1352

(376)

So if a Piece be 10 Inches square, the Answer will be, that 17 Inches and $\frac{22}{100}$ of an Inch is required for the Length. And thus may a Table of square Timber be proved.

Sawyers Work.

IN this place it may not be improper to say something in relation to the Method used by *Sawyers* in measuring their Work. When they work by the Great (as they say) most commonly they measure their Work by the superficial Foot ; so there is no great Difficulty in taking the Dimensions ; for they account the Depth of the Carf for the Breadth, and the Length for the Length. The Dimensions being thus taken in Feet, the Content of one Carf superficial may be found by multiplying the Length by the Breadth ; and then having found the number of Feet in one Carf, multiply it by the number of Carfs of the same Dimensions, and you will have the number of Feet in them all.

Note, 1st, When thus they have cast up the whole Content of their Work in Feet, they are paid for it by the Hundred, that is, 100 Feet.

2^{dly}, That if the Carf be but 6 Inches (or less in Depth, then they have a Custom to be paid for Carf and half, (as they express it ;) *i. e.* for half so much more as it comes to by Measure ; and the Reason they urge for it is, that the Trouble is great in often binding

ing and removing their Timber, and therefore they insist on the Custom of Price.

3dly, For breaking Work, (that is, for butting a Log through the Middle) and Slabbing, (i. e. cutting off the out-side pieces) if the Carf be more than 12 or 13 Inches deep, they are paid by the Foot Lineal or Running Measure, at different Prices, according to the various Depths of the Carf; and are as follows;

Inches deep	d. grs.	
15	1	} per Foot.
18	2	
20	2	
22	2	
24	3	
26	3	
28	4	
30	4	
32	5	
34	5	
36	6	

4thly, In some places, it is customary to allow the Sawyer but one breaking Carf in a Log, tho' there be never so many Carfs deep in the Log. — But some Sawyers claim to have half Breaking Work, and half Hundred Work; that is, if they have four Carfs deep, then they will have two Breaking Work, and the other two Hundred Work.

5thly, In Sawing Bevil-Work, as Hipps and Sleepers, &c. Posts, &c. in Bevil-Frames, Posts or Punchions in Polygonal Turrets, &c. also Contrails, &c. for these they work by the Hundred, but always reckon Carf and half for such sort of Work; that is, they reckon half as many more Feet of Work than they really do.

Thus

Thus have I gone through what I have Room for, in relation to the several Descriptions and Uses of the Instruments commonly made use of in Mensuration, and particularly applied to the Service of the Ingenious Artift the Carpenter.

The next necessary Qualification that I shall touch upon, to introduce a young Man into the Knowledge of Business, is to say something in relation to the Art

Of Gauging.

THERE is a near Sort of Kindred or Affinity between the Art of Measuring of Timber, and that of Gauging or Measuring of Liquors ; for both are performed by Cube or Solid Measure, and therefore not improper closely to follow one another. For as often as there are found 1728 solid or cubick Inches in a Piece of Timber, (of what Form soever,) so many solid Feet is it said to contain : So likewise in the Art of Gauging, so many times as 282 (the solid Inches in a Beer or Ale Gallon) are found in any Vessel of such Liquor, so many Gallons is such a Vessel said to hold. And so of Wine ; but in that the Divisor alters, it being 231 solid or cubick Inches.

And the Gallon of Dry Measure, contains 272 cubical Inches.

Note, Every Cubical Foot in Beer or Ale Measure, contains 6 Gallons and almost a Pint.

The same in Wine Measure, is 7 Gallons, 2 Quarts, and almost a Pint.

A Cubical Foot of Dry Measure contains 6 Gallons and somewhat above half a Gallon.

For, 141 Inches make 2 Quarts of Beer or Ale ; 70 Inches $\frac{1}{2}$ one Quart, and 35 Inches $\frac{1}{4}$ a Pint.

To

To find the Content of any Vessel that hath the Form of a Cube, that is, a Figure whose Breadth, Depth, and Length are all equal, and is very well represented by the Shape of a Dye commonly play'd withal.

Rule. Multiply the Side into its self, and then again that Product by the Side; which last Product, if for Beer or Ale, divide by 282, the Inches in a Beer or Ale Gallon; and for Wine, Brandy, &c. by 231, the cubical square Inches contained in a Wine Gallon.

Example.

Suppose a Cube whose side is 79 Inches, I demand the solid Content in Beer and Wine Gallons?

79	282	493039	(1748 Beer or Ale
79	282	...	Gallons.
711	2110		
553	1974		
6241	1363		Wine Gall.
79	1128	231	493039 (2134
			462 ...
56169	2359		
43687	2256		310
			231
493039 Cube Inches	(103)		
			793
			693
			1009
			924
			(85)

To

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To find the Content of a Parallelepipedon, which is a solid Figure contained under six Sides, of which the Opposites are parallel, and of the Form of Figure the 12th.

Rule. Multiply the Length by the Breadth, and that Product by the Depth; and then divide by 282 for Beer or Ale, and 231 for Wine.

Example.

Admit the Length to be 95 Inches, and the Breadth 62 Inches, and the Depth 23 Inches; what is the Content in Beer and Wine Gallons?

	95 Length
231) 135470 (586 Wine Gall.	62 Breadth
1155	190
1997	570
&c.	5890
rem. (104)	23 Depth
	17670
	11780
	282) 135470 (480 Beer Gall.
	1128
	&c.
	rema. (110)

To Guage a Back or Square Tun.

Example.

Suppose its Length 112 Inches, Breadth 72 Inches, and its Depth 48 Inches; what is its Content in solid Inches, and also its Content in Beer Gallons?

112 Length 282) 387072 (1372 Gallons Answ.
72 Breadth 282 ...

224 1050
784 846

8064 2047
48 Depth 1974

64512 732
32256 564

387072 solid Inches (168)

To bring these Gallons into Barrels, divide them by 36, the Gallons in a Barrel of Beer, thus :

36) 1372 (38 Answer, 38 Barrels and $\frac{3}{8}$ or $\frac{1}{2}$ of a Barrel ; and for the Remainder 168, it is something above half a Gallon.

292
288

(4)

Note, *The Duty of Excise upon Strong Beer and Ale, is 6 s. and 6 d. per Barrel : Brewers are allowed three Barrels in twenty three for Leakage, &c. both for Strong and Small Beer ; and for Ale, two in twenty two : So that the nett Excise of a Barrel of Strong Beer to be paid by the common Brewers, is 5 s. 7 d. $\frac{3}{4}$ and $\frac{7}{23}$ of a Farthing ; and of Ale, 5 s. 10 d. $\frac{3}{4}$ and $\frac{14}{23}$ of a Farthing ; and for Small Beer, 1 s. 3 d. $\frac{1}{2}$ and $\frac{2}{3}$ of a Farthing.*

How to Gauge a Copper, round Tub, or Furnace.

If it be of equal Bigness both at Top and Bottom, find the Cube Inches that it contains, and then bring it into Gallons, as before.

But

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But if it be wider at the Top than at the Bottom, or the contrary ; then take the Width or Diameter of the Tub somewhat above the Middle, next to the broadest End, if it be Taper ; or find the mean Diameter thus : Suppose the Bung-Diameter to be 26 Inches, and the Head Diameter of the Cask or Tun to be 23 Inches, the Difference between which is 3 Inches, two thirds of which make two Inches ; which added to the lesser of the two Diameters, makes 25 for the mean Diameter sought. Having the mean Diameter, proceed to find the Content in solid Inches, thus : First square the mean Diameter, which Product multiply by 11 always, and divide ever by 14, and the Quotient will give the Content of the Liquor at one Inch deep, if there be any in the Cask, Tub, Tun, or Furnace.

Example.

Suppose the mean Diameter to be 72 Inches, and the Length 56 Inches.

72

72

—

144

504

—

5184 the Square of the mean Diameter.

11

—

14) 57024 (4073

56... 56 the Length.

—

102

24438

98

20365

—

44

228088 solid Inches.

42

—

(2)

The

The aforesaid solid Inches brought into Gallons, make 808, and 232 solid Inches remain, something above three quarters of a Gallon; in all 22 Barrels, 16 Gallons, and $\frac{3}{4}$ of Beer.

Again, Admit the mean Diameter of a Spheroid or Wine Pipe to be 14 Inches, and the Length 72 Inches, what's the Content in Wine Gallons?

$$\begin{array}{r} 14 \\ 14 \\ \hline \end{array}$$

196 the Square of the mean Diameter
11 multiply ter 14.

Divi. by 14) 2156 (154
72 the Length.

$$\begin{array}{r} 308 \\ 1078 \\ \hline 231) 11088 \text{ (48 Gallons Answer.)} \\ 924 \\ \hline 1848 \\ 1848 \\ \hline (0) \end{array}$$

Or the Content of a Spheroid may be found thus: Multiply the Square of the shortest Diameter by the longest Diameter, and then divide by 583 for Beer Gallons, and by 441 for Wine Gallons.

Example.

Suppose a Spheroid whose shortest Diameter is 74 Inches, and the longest 125 Inches; what is the Content in Beer and Wine Gallons?

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$$\begin{array}{r}
 74 \\
 74 \\
 \hline
 296 \\
 518 \\
 \hline
 \end{array}$$

5476 the Square of the shortest Diamet.

125 the longest Diameter.

$$\begin{array}{r}
 27380 \\
 65712 \\
 \hline
 \end{array}$$

538) 684500 (1272 Gallons of Beer.

538

1465 &c.

(164)

441) 684500 (1552 Gallons of Wine.

441

2435 &c.

(68)

To find the Content of the Frustrum of a Sphæroid;
 First take the Diameter at the Bung Circle and find
 it's Content in superficial Inches by multiplying it in-
 to its self, then multiply that Product by 11; which
 Product divide by 14, and the Quotient gives the
 Content; and then take two Thirds of that Number
 or Content. This do for the Diameter of the Head of
 the Cask; then add these two Thirds together, and
 multiply that Total by the Length of the Cask in In-
 ches, and the Product will give the Content of the
 Vessel

Or, The Carpenter's Exact Rule. 331

Vessel in cubick Inches ; which may be reduced into Gallons as before. — Or thus ; to twice the Square of the Bung Diameter, add once the Square of the Head, and multiply that Sum by the Length : And for Beer, divide by 1077 ; and for Wine Gallons, divide by 882.

Example.

A Cask whose Bung Diameter is 23 Inches, Head Diameter 21 Inches, and Length 27 Inches ; what is the Content in Beer and Wine Gallons ?

$ \begin{array}{r} 23 \\ 23 \\ \hline 69 \\ 46 \\ \hline 529 \\ 529 \\ \hline 441 \end{array} $	$ \begin{array}{r} 21 \\ 21 \\ \hline 21 \\ 42 \\ \hline 441 \end{array} $
add {	} twice the Bung Diameter.
$ \begin{array}{r} 1499 \\ 27 \text{ the Length.} \\ \hline 10493 \\ 2998 \\ \hline 1077) 40473 \text{ (37 Beer Gallons.} \\ 3231 \cdot \\ \hline 8163 \\ 7539 \\ \hline (624) \end{array} $	$ \begin{array}{r} 882) 40473 \text{ (45 Wine Gallons.} \\ 3528 \cdot \\ \hline 5193 \text{ almost 46 Gall.} \\ 4410 \\ \hline (783) \text{ remaining.} \end{array} $

To find the Quantity of Liquor remaining in a spheroidal Cask standing on its Head.

From the Area of the Bung-Diameter, subtract the Area of the Head Diameter, and multiply the Remainder by the Square of the Difference between the Wet Inches and the Semi-length, and this Product divide by the tripple Square of the half Length, and subtract the Quotient from the Area of the Bung-Diameter ; then multiply the Remainder by the Difference between the Wet Inches and the Semi length, and the Product will be how much Liquor is contained in the Vessel above, or under its half Content.

Example.

Suppose { the Bung ————— 40,8
the Heads ————— 35,3 } what is the Con-
the Length ————— 61,8 } tent in Beer Gal-
the Wet Inches — 41,9 } lons ?

$\frac{1}{2}$

61,8 the Length

11

30,9 the half Length

11

41,9 the Wet Inches

are 121

30,9 the half Length

11,0 the Difference

Area

Or, The Carpenter's Exact Rule. 333

Area of the Bung Diameter 4,6362
 Ditto of the Head Diameter 3,4705 sub.

1,1657
 The Square of the Difference 121

11657
 23314
 11657

The triple Sq. of the $\frac{1}{2}$ Length 2865) 141,0497 (492
 11460

30,9 4,6362 Area of the Bung. 26449
 30,9 sub. 492 the Quotient 25785

2781 45870
 9270 11 6647
 5730

954,81 50,4570
 3 (917)

2864,43

131,25 the half Content of the Vessel.
 50,45 the Liquor qt. above the half Content.
 118,70 the Quantity of Liquor qt. in the Vessel.

To Gauge any Thing that hath the Shape of a wooden
 Hand-Bowl, as the Bottom of a round Copper, &c.

Admit the Bowl to be full of Water; the first Thing
 is to measure the Surface of the Water; that is done
 by multiplying half the Circumference by half the
 Diameter, and that gives the Content in superficial
 square Inches. Then find the Depth of the Water in
 different

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different Places, then add those different Depths together, and divide the Total by the Number of Depths that you take, and the Quotient gives the mean Depth : When you have found the mean Depth, multiply it by the Number of Inches that you found on the Surface of the Water, and the Product gives the solid square Inches ; which reduce to Gallons as taught before.

Example.

Suppose the Circumference be 120 Inches, the half of which is 60 Inches, and the Diameter admit to be 60 Inches, the half of which is 30 Inches ; and suppose the several Depths to be 7, 8, 9 and 10, which put together make 34 Inches ; which divide by 4, the Number of Depths, quotes the mean Depth, viz. $8\frac{1}{2}$.

$$\begin{array}{r} 60 \\ 30 \\ \hline 1800 \\ 8\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 14400 \\ 900 \\ \hline \end{array}$$

331) 13300 (66 Answer, 66 Wine Gallons, 3
1386: Gallons above a hhd.

1440 282) 13300 (854 Beer Gallons
1386 1410: or a hhd.

1200
1128
72
Having

Or, The Carpenter's Exact Rule. 335

Having the Circumference of a Circle, to find the Diameter; & *contra*, having the Diameter of a Circle, to know its Circumference.

The Proportion is as 7 to 22.

So that if the Length of the Diameter be 7 Inches, then the Circumference is 22 Inches.

Example:

If the Circumference of a Circle be 132 Inches, what is the Diameter? Multiply by 7, and divide by 22, &c.

$$\begin{array}{r} 132 \\ 7 \overline{) 924} \\ \underline{88} \\ 44 \\ 44 \\ \underline{0} \end{array}$$

Answer, the Diameter is 42 Inches in Length.

Again, If the Diameter be 42 Inches, what is the Circumference?

$$\begin{array}{r} 42 \\ 22 \overline{) 84} \\ \underline{84} \\ 0 \end{array}$$

Proof 132 Inches Answer.

Once

Once more. If the Circumference of a Circle be 50 Inches $\frac{2}{7}$, what the Diameter?

$$\begin{array}{r} 50 \\ \hline 22 \overline{) 352} \quad (16 \text{ Inches.} \\ 22 \cdot \end{array}$$

$$\begin{array}{r} 132 \\ \hline 132 \\ \hline \end{array}$$

(0)

If the Diameter be 16 Inches, what the Circumference?

$$\begin{array}{r} 22 \\ \hline 32 \\ \hline 32 \\ \hline 7 \overline{) 352} \end{array}$$

50 In. $\frac{2}{7}$ Answer.

The Extraction of the Square and Cube Roots, of great Use in Measuring, Gauging, &c.

The Square-Root.

1st, **A** Square Number is any Digit, or any other Number, which being multiplied into itself, produceth a Square Number ; as 4 multiplied by 4, produceth 16 ; so 16 is the square Number, and 4 is said to be the Root of 16, because it grows from, or is produced of 4 ; so 4 is the Square of 2, for twice 2 is 4, and 9 is the Root of 81, for 9 times 9 is 81, &c.

2^{dly},

2^{dly}, To Extract the Square Root of any Number, is to find another Number which multiplied by (or into) its self, produces the Number given, and is a Proof of the Work.

3^{dly}, Square Numbers are either Single or Compound.

4^{thly}, All single Square Numbers, with their respective Roots, are contained in the following Table, viz.

Roots	1	2	3	4	5	6	7	8	9
Squares	1	4	9	16	25	36	49	64	81

5^{thly}, When the Root of any square Number is required less than 100, and yet not exactly a Single Square expressed in the Table above; then you are to take the Root of the square Number expressed in the Table, which (being less) comes the nearest to the given Number to be squared: as suppose 60, the nearest Root to it (as being less) is 7, and 12 being given, the Root belonging to it is 3.

6^{thly}, A Compound square Number is that which is produced of a Number (consisting of more Places than one) multiplied by itself, and never less than 230: so 729 is a Compound square Number, produced by the multiplying 27 into its self.

7^{thly}, The Root of any Number under 100 may be easily known by the foregoing Table of single Squares: But to extract the Root of a Compound Number of several Places, observe the following Directions, in relation to finding the Root of this square Number 45796.

1. Set a Point over the Place of Units thus, 45796 and so successively over every second Figure towards

Q

the

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the Left-hand, as thus, $45\dot{7}9\dot{6}$; and again thus, $45\dot{7}9\dot{6}$. Thus must your Number be prepared for Extraction in Natural Numbers : (But in Decimals, you must point from the Place of Primes towards the Right-hand, omitting one Place, as above ; and if the Decimals are odd, affix a Cypher towards the Right-hand of them to make them even). Your Number thus prepared, draw a crooked Line on the Right of the Number, as in Division : And indeed the Operation of the square Root is not much unlike Division ; only there the Divisor is fixt, and in the square Root we are to find a new one for each Operation. I say, ha-

ving made a crooked Line thus, $45\dot{7}9\dot{6}$ (seek the nearest Root in the foregoing Table, to the first Point on the Left-hand, which here is 4 the Root of which is 2, which place behind the crooked Line, thus ;

$45\dot{7}9\dot{6}$ (2

then set the Square of the Root 2, which is 4, under the first Point thus :

$45\dot{7}9\dot{6}$ (2 .

4

0

and subtract it, and there remains 0 : Then to the Remainder, bring down the next Point 57 thus :

$45\dot{7}9\dot{6}$ (2

4

057

which call the Resolvend ; then double the Root of the first Point, and place it on the Left-hand of the Resolvend (or proper enough the Dividend (thus :

$45\dot{7}9\dot{6}$

$$\begin{array}{r} 45796 \quad (2 \\ 4 \end{array}$$

4

4) 57

The 4, the double of the Root 2, on the Left-hand of the crooked Line, call the Divisor; then seek how often 4, the Divisor, can be taken in 5, the first Figure of the Resolvend 57, (for you are to omit the last Figure towards the Right-hand) which here is once, which 1 place behind the Root 2, and also behind the Divisor 4, thus:

$$\begin{array}{r} 45796 \quad (21 \\ 4 \end{array}$$

4

41) 57

Then multiply the Divisor (now) 41, by the Figure last placed in the Root, viz. 1, and place it under the Resolvend thus, and subtract it therefrom.

$$\begin{array}{r} 45796 \quad (21 \\ 4 \end{array}$$

4

41) 57

41

16

Then bring down the next Point, viz. 96, and place it on the Right of the Remainder 16, for a new Resolvend or Dividend, thus:

$$\begin{array}{r} 45796 \quad (21 \\ 4 \end{array}$$

4

next double the Quotient, or part of the Root, viz.

41) 57

41

21, and place it for a new Divisor to the new Resolvend 1696, thus:

$$\begin{array}{r} 41) 1696 \end{array}$$

Q 2

Then

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Then seek how oft 42 in 169 ? (still reserving or omitting the unit Figure of the Resolvend or Dividend, as aforesaid,) and I find I can have it 4 times, which I place in the Quotient, or place of the Root, and then the Work appears thus :

$$\begin{array}{r}
 45796 \quad (214 \\
 4 \\
 \hline
 41) 57 \text{ Resolvend.} \\
 41 \text{ Product.} \\
 \hline
 224) 1696 \text{ Resolvend.} \\
 1696 \text{ Product.} \\
 \hline
 (0)
 \end{array}$$

In the last Step, I place 4 in the Root, and likewise 4 behind the Divisor 42, which makes the new Divisor 424, to the Resolvend 1696; which Divisor multiplied by 4, the times placed in the Root, produces 1696; equal with the Dividend or Resolvend aforesaid, as in the Operation may be seen. So that the square Root of 45796 is 214; for, 214 multiplied into its self, produces 45796, the Number given, whose square Root was sought.

More Examples.

What's the square Root of 12299049 (3507 the Root

$$\begin{array}{r}
 9 \\
 1st \text{ Divisor } 5) 329 \text{ Resolvend.} \\
 325 \text{ Product.} \\
 \hline
 2d \text{ Divisor } 700) 490 \text{ Resolvend.} \\
 000 \text{ Product.} \\
 \hline
 3d \text{ Divisor } 7007) 49049 \text{ Resolvend.} \\
 49049 \text{ Product.} \\
 \hline
 (0)
 \end{array}$$

Desi.

Or, The Carpenter's Exact Rule. 341

Decimally.

160,000000 (12,649

1

22) 60

44

246) 1600

1476

2524) 12400

10106

229400

227601

(1799)

Note, That when the Divisor cannot be had in the Resolvend, then place a Cypher in the Quotient, and also in the Right of the Divisor, and bring the Resolvend a Step lower, and then bring down the next Square, &c. as in the Example above may be seen.

Note further, If any Remainder happen to be after Extraction, you may proceed by annexing Pairs of Cyphers to the Left of the given Number, and so come to what Exactness you please.

Note also, Such Numbers given for Extraction that leave Remainders, are by some called Irrationals, because their Roots cannot be exactly discovered, but still there will something remain, though you work by Whole Numbers or Fractions: as in the Example above, where the Remainder is 1799.

Q 3

The

The Extraction of the Cube-Root.

TO Extract the Cube Root of any Number, is to find another Number which multiplied by its self, and that Product by the Number found, produces the Number given for Extraction.

From the foregoing Table for Extraction of the Square Root, proceed the several Squares of the Cube Root; viz.

<i>Roots,</i>	1	2	3	4	5	6	7	8	9
<i>Square,</i>	1	4	9	16	25	36	49	64	81
<i>Cube.</i>	1	8	27	64	125	216	343	512	729

1st, To prepare any Number for Extraction, make a Point over Unity, and so successively over every third Figure, missing two between each Point; but in Decimals, you must point from the Place of Units to the Right-hand, &c.

Example.

Extract the Cube Root of 46656, prepared thus, as above directed,

46656

Here are but two Points, therefore the Root will have but two Places.

2^{dly}, The Number being prepared, seek in the foregoing Table the nearest Root to the first Point or Period 46, which you will find to be 3, which place in your Quotient thus, 46656 (3 the Cube or Triple whereof, viz. 27, which place under your first Point

Point 46, as in the Margent ; the which subtract from 46, and there rests 19 ; this is your first Work, and no more repeated. Then to the Remainder 19, bring down the next Period, viz. 556 (which is the last) and place it on the Right of the Remainder 19, thus :

$$\begin{array}{r} 46656 \text{ (3)} \\ 27 \\ \hline \end{array}$$

19656 Resolvend.

Then draw a Line under the Resolvend ; next square the 3 placed in the Quotient, which makes 9, which multiplied by 300 makes 2700 for a Divisor, which place accordingly thus :

$$\begin{array}{r} 46656 \text{ (3)} \\ 27 \\ \hline \end{array}$$

2700) 19656

Then seek how often 2 in 19 ? Answer, but 6 times, because of the Increase that will come from the Quotient ; then multiply the Divisor by 6, and the Product will be 16200 ; which place orderly under the Dividend thus :

$$\begin{array}{r} 46656 \text{ (36)} \\ 27 \\ \hline 19656 \\ \hline 16200 \end{array}$$

Q 4

Then

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Then proceed to find the Increase coming from the Quotient, thus: Square your last Figure 6, and it makes 36; which multiply by 3, the other Figure of the Quotient, it gives 108; which multiplied by 30, makes 3240. This Place also orderly under the last Number before set down, *viz.* 16200, and the Work will appear thus:

$$\begin{array}{r}
 46656 \text{ (36)} \\
 27 \overline{) 19656} \\
 \underline{16200} \\
 3240 \\
 \underline{216} \\
 19656
 \end{array}$$

Then Cube the Figure last placed in the Quotient, *viz.* 6, and it makes 216; which place orderly likewise under the Line 3240, as above; then add the three Lines together, and they make 19656, (for so many you always have after the first Operation.) And seeing the Total to be equal to the Dividend above, *viz.* 19656, and no more Periods to bring down, I see the Work finished, and find the Cube Root of 46656 to be 36.

Some Uses of the Square and Cube Roots.

Rule. **T**HE Root of the Product of the given Numbers, is the Mean Proportional sought.

sought; so the Mean Proportional between 16 and 64, will be 32: This is of good Use in finding the Side of a Square, equal to any Parallelogram, Rhombus, Rhomboides, Triangle or Regular Polygon.

2. *To find the Side of a Square equal to the Area of a given Superficies.*

Rule. The Square Root of the Content of any given Superficies is the Side of the Square.—So if the Content of a given Circle be 160, the Side of the Square equal will be $12\frac{2}{3}$ or in Decimals 12,64911.

3. *The Area of a Circle given to find the Periphery.*

Rule. Say, as 113 to 1420, or 1 to 12,56637; so is the Area to the Square of the Periphery.—So if the Area of a Circle be 160, the Periphery will be found to be 44,84.

4. *The Area of a Circle given to find the Diameter.*

Rule. As 355 to 452, or as 1 to 1,273239, so is the Area of the Square of the Diameter.

5. *Any two Sides of a Right Angled Triangle being given to find the third Side.*

In this useful Problem lies hid a great Part of the Mathematicks; it being asserted and proved, that the Square of the Hypothenuse, or longest Side of a Right Angled Triangle, is equal to the Sum of the Squares of the Base and Perpendicular, that is, the other two Sides.

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Example by Figure 13.

Let the Base or Ground AB represent the Breadth of a Moat or Ditch, and the Perpendicular BC represent the Height of a Castle, Tower, or City Wall; and the Hypothenufe, or longest Side, represent the Length of a Scaling-Ladder.

In this Figure, the Base AB is supposed to contain 40 Yards; and the Perpendicular, or Height of the Tower or Wall, 30 Yards; What Length will the Hypothenufe AC , or the Scaling-Ladder, be?

Rule. The Square Root of the Sum of the Squares of the Base and Perpendicular, is the Length of the Hypothenufe, as per Work.

1600 the Square of the Base 40.

900 the Square of the Perpendicular 30.

2500
The Sum 2500 (50 Yards the Root, or Length of the Scaling-Ladder.

25

(0)

And if the Length of the Base, or Breadth of the Ditch, were required; then the Square Root of the Difference of the Squares of the Hypothenufe and Perpendicular is the Length of the Base, or Breadth of the Ditch or Moat. *Example per Work.*

2500 the Square of the Hypothenufe AC .

900 the Square of the Perpend. BC .

1600
the Differ. 1600 (40 Yards the Root, or Breadth of the Ditch.

16

(0)

And

And if the Height of the Tower or Perpendicular *BC*, were required ; then the Square Root of the Difference of the Distance of the Squares of the Hypothenuse and Base, is the Height of the Perpendicular *BC*, representing a Tower, a Wall, Steeple, or any thing else.

Again, Any Number of Men given to be formed into a Square Battalia, to find the Number of Rank and File. *Rule*, The Square Root of the Number of Men given, will be the Number of Men to be placed in Rank and File. *Example*, Admit an Army of 32400 Men were to be formed into a square Battalia; the square Root of 32400 will be found 180 ; and so many Men must be placed in Rank, and also in File.

The Uses of the Cube Root are to find out a Proportion between like Solids, as Globes, Cylinders, Cubes, &c.

Example.

Suppose a Bullet of 3 Inches Diameter weigh 72 Pound, what will a Bullet weigh whose Diameter is 4 Inches ?

Rule, Since like Solids are in Triple Proportion to their Sides, Diameters, Lines, &c. it holds, As the Cube of the Diameter given is to the Weight thereof, so is the Cube of the Diameter sought, to the Weight thereof : as per Work.

$$\begin{array}{rcccl} & C D & & l b. & & C D. \\ \text{If } 512 & \text{---} & 72 & \text{---} & 64 \end{array}$$

64

288

432

512) 4608 (9 Facit, 9 Pounds.

4608

(o)

Example

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Example 2.

If a Ship of 100 Tuns be 44 Foot long at the Keel, of what Length must the Keel be of a Ship that carries 220 Tuns?

Say, as 100 is to the Cube of 44, that is, 85184 ; so is 220 to 1874048 ; whose Cube Root is 57,225 the Length of the Keel sought.

Example 3.

There is a Cubical Vessel whose Side is 12 Inches, and it is required to find the Side of a Vessel that holds three times as much. Here the Cube of 12 is 1728 which multiplied by _____ 3

produces _____ 5184

and the Cube Root of which is 17,306 the _____ Answer required, or Side sought.

An easy Rule to find the Length of the Masts of a Ship, viz.

Two thirds of the Length of the Keel, and the Breadth of the Beam, is the Length of the Main-mast ; and the Rule is therefore, to multiply the Length of the Keel by 2, and to divide the Product by 3, and then to the Quotient add the Breadth of the Beam, and the Total is the Length of the Main-mast.

Example.

Suppose a Ship to be 108 Foot by the Keel, and 40 Foot by the Beam, what is the Length of her Main-Mast ?

108

2

3) 216

Add { 72 two-thirds of the Keel.
40 the Breadth of the Beam.

Answer 112

Answer, the Length of her Main-mast is 112 Foot, as in the Work.

Again.

Admit a Ship to be 84 Foot by the Keel, and 31 Foot by the Beam, what is the Length of her Main-mast?

84 per the Keel.

2

3) 168

Add { 56 two thirds of the Keel.
31 the Breadth of the Beam.

Answer 87 Foot, the Length of the Main-mast.

If you divide first by 3, and then multiply the Quotient by 2, it gives the two thirds of any thing, as well as the other way.

Another Way to find the Lengths and Thickness of Masts and Yards; viz.

The Way to find the Length of the Main-mast, is to add the Breadth of the Beam, and the Depth of the Hold together, and divide the Total by 1,5 and the Quotient will be the Length of the Main-mast in Yds.

Exam-;

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Example.

Admit a Ship whose Keel in Length is 73 Foot, and the Breadth of the Beam 28,5 Foot, and the Depth of the Hold 12 Foot; what is the Length of the Main-mast?

Foot

28,5 Breadth of the Beam.

12,0 Depth of the Hold

1,5)40,5 (27 yds Answer.

30

105

105

(0)

Answer, 27 Yards, or 81 Foot, as per Work.

Or if, instead of Dividing, you multiply by this Multiplier, viz. ,6666 and point off the Decimals, you will have the same Answer.

Example.

40,5

,6666

33330

266640

26,99730

Here the Answer is 26 yards and $\frac{99}{1000}$ of a yard, not wanting one Second to make it 27 yards, as before.

I here multiply the under by the upper Number, to have both Figures and Room.

To find the Thickness of the Mast, having the Length, say, by the Rule of Proportion, (or Rule of Three) If 84 Foot long require 28 Inches thick, what 81 Foot long? as in the following Work.

If

P. 1. In. thick P. 1.
If 84 — 28 — 81
28

648

162

84) 2268 (27 Inches thick Answer.

168

588

588

(6)

By *Trigonometry*, or the Doctrine of Triangles, are Multitudes of Questions solv'd, relating to Sailing on the Seas; to give one Instance with respect to the foregoing Triangle, viz. suppose two Ships set sail at one time, from one Place, the one sailing directly East 28 Leagues, as from C to B; and the other directly North, as from C to A, 36 Leagues; the Question is, how many Leagues are they distant or asunder one from the other?

48 multiplied by 48, produces — 2304

36 multiplied by 36, gives — 1296

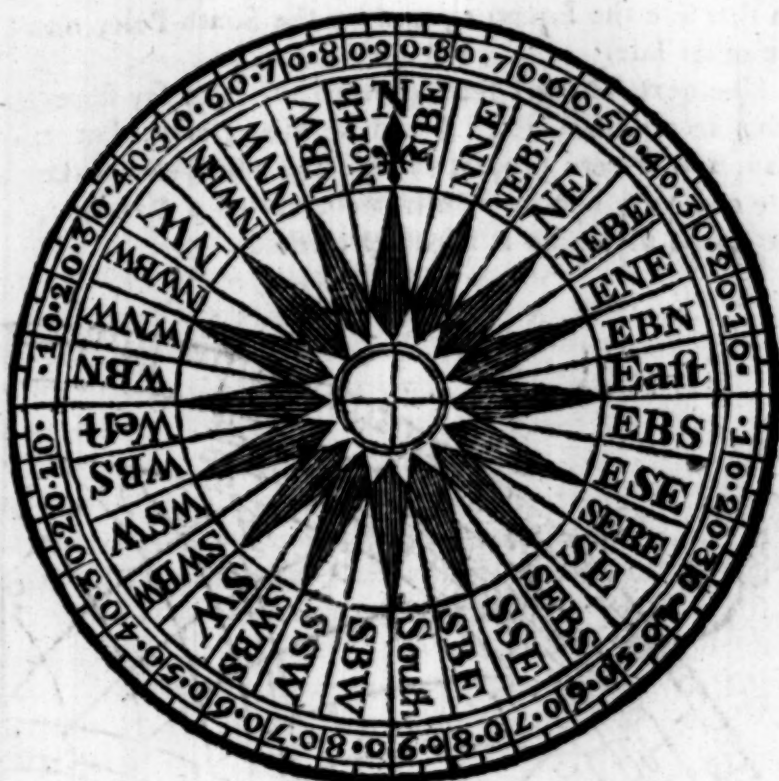
which two Numbers added, gives for Total 3600 (60 the square Root of which is 60; and so 36 many Leagues are the two Ships asunder or distant one from the other. — Here the Distance of each Ship's sailing is squared, and their Squares added together, and the Total is 3600; the square Root of which is 60, and the Answer to the Question, as in the Work.

And

And being here speaking something relating to Sea-Affairs, it may not be improper to say something concerning the Mariners Compass.

Before the Invention of this excellent and most useful Instrument, it was usual in Voyages to sail by, or keep along the Coast, or at least to have it in sight ; as is manifest, and plainly evident, by the Voyages of *St. Paul*, *Acts* xx. 12, and 27 ; which Course made their Voyages long, and very dangerous, by being so near the shore. But now, by the help of a Needle touched by the Magnet, or Load-stone, which by a wonderful and hidden Quality, inclines its Point always Northerly, the ingenious Mariner is directed in his proper Course of Sailing, through the vast Ocean, and unfathomable Depths, to his intended Port : And if the Wind is favourable, can Sail near 333 Leagues, or 1000 Miles in a Week, tho' in the darkeſt Weather, or darkeſt Night, when neither Land, Moon, nor Stars, are to be ſeen ; which before, were the only Guide ; and, if not ſeen, the Sailors were at great Loſs, and expoſed to the moſt imminent Danger.

Behold the Figure or Representation of the ſaid Compass, with the Cardinal and other Winds, as followeth.



The Description.

1st, The Needle in the Centre points with its principal End to the *Flower-de-Luce*, and shews its direction Northerly: And the said *Flower-de-Luce* is also placed in Maps to the same intended Purpose.

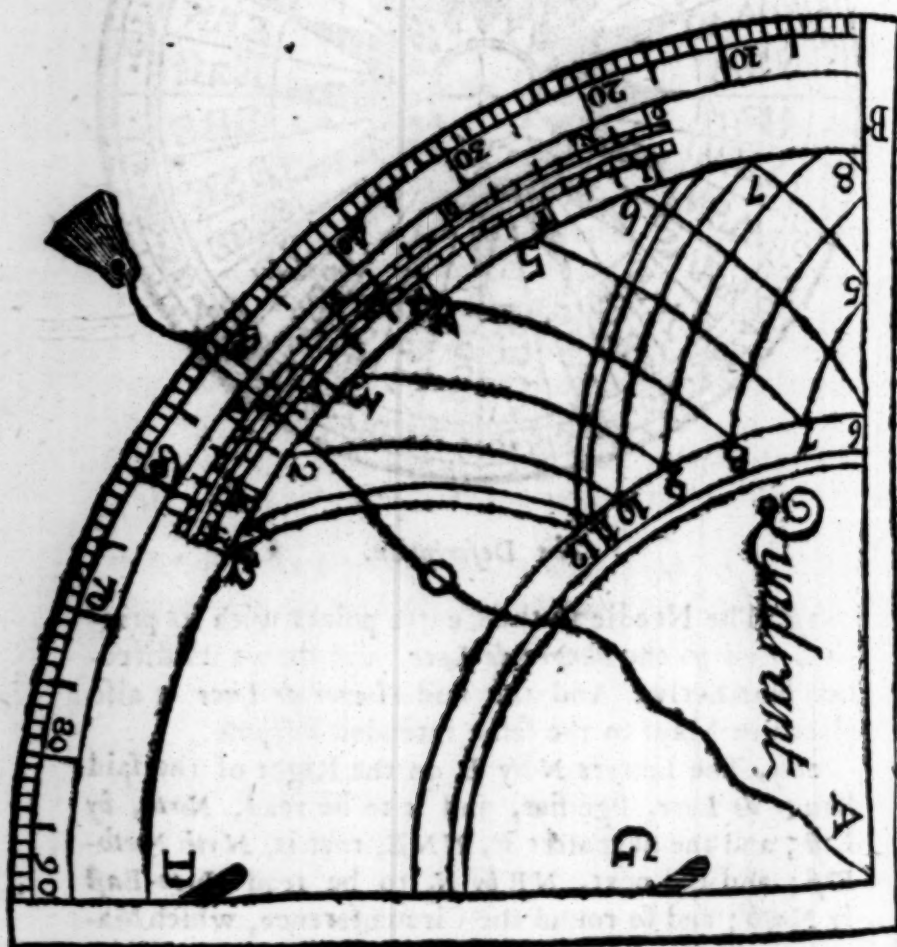
2^{dly}, The Letters *N by E* on the Right of the said *Flower-de-Luce*, signifies, and is to be read, *North, by East*; and the next after it, *NNE*, that is, *North North-East*; and the next, *NE by N*, to be read *North-East by North*; and so round the Circumference, which Mariners usually have by Heart, particularly the Pilot, who guides the Ship accordingly; and sometimes he is helped by the light of the North-Pole Star, when

on

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on this side the Equator ; and by the South-Pole, on the other side.

The next Thing I shall proceed to, is to say something in relation to the Art of M. king Dials : But it may, and is very proper, to describe and speak of the Use of a very necessary Instrument called a *Quadrant*, the Shape of which is here represented.



This

Or, *The Carpenter's Exact Rule.* 355

This Quadrant, or Quarter of a Circle, is variously useful, on sundry Accounts, viz. to take Heights and Distances, whether accessible or inaccessible; to find the Hour of the Day, &c.

Its Description.

The outward Arch is divided into 90 Parts or Degrees, (being the 4th part of a Circle of the Sphere) and Figured from 10, 20, &c. to 90; above which Figures, are Letters signifying the 12 Calendar Months of the Year, as *I* for *January*, *F.* for *February*, &c. And again, over those Letters for the Months, are Lines to know the Hour of the Day: And upon the Line *G D*, are sights of thin Brass to be spied through, or for the Sun to shine through, from one to the other. Lastly, in the Middle, or Point of the Quadrant, viz. at *A*, is a Line or Thread of silk fixed, through a Hole with a Plummets of Lead at the End of it, and also a small Bead in the Middle.

Some of the many Uses of this Instrument are as follows.

Of Heights.

Suppose you would know the Height of a Steeple, Tower, or Tree; hold up the Quadrant, and view through the sights the Top of the Steeple, Tower, or Tree, and then step forwards or backwards, till you find the Plummets hang at liberty just at 45 Degrees, that is, just in the Middle of the Quadrant; then is the Height of the Steeple, Tower, or Tree, equal to the Distance of your standing-place from the Bottom of the Steeple, adding for the Height that you hold the Quadrant from the Ground.

If the Plummets intersect one quarter of the Quadrant, or 22 degrees and half, then twice the Distance of your standing is the Height; and if three quarters of the Quadrant, or 67 degrees and half, then half the distance of your standing is the Height.

To

To find the Hour of the Day.

Lay the Thread just upon the Day of the Month, then hold it till you slip the small Bead, or Pins-head to rest on one of the 12 a Clock Lines ; then let the Sun shine from the sight at *G* to the other at *D*, the Plummert hanging at liberty, the Bead will rest on the Hour-line of the Day.

To find the Latitude of a Place.

Hold up the Quadrant, and thro' the sights thereof, (or along the Edge) spy (in a clear Star-light Night) the North-pole Star ; the Plummert hanging at liberty, the Thread will rest on the Degrees of Latitude of the place you be in, or where you take your Observation: If at *London*, you will find it 51 Degrees and 32 Minutes: If at *Bristol*, 51 Degrees 27 Minutes: If at *Tork*, 53 Degrees 58 Minutes: And if at *Berwick*, 55 Degrees 54 Minutes, &c.

When it is said, that such a Kingdom, Country, City, Town, or Place, lieth from 40 to 50 Degrees North Latitude, it is to be understood, that it lieth on the North side of the Tropick of *Cancer*, or North Boundary of the Sun towards us of *England*, to which the Sun comes about the 10th or 11th Day of *June*, and makes our Days the longest: and about the 10th or 11th Day of *December*, the Sun enters the Tropick of *Capricorn* its South Boundary, and is then the farthest from us, and makes our Days the shortest.

Of Dialling.

Dialling is a very Ancient Art, even as Old as the Time of King *Hezekiab*, where mention is made of the Dial of *Abaz*, in the 2d Book of *Kings*, Chap. xx. verse 11.

The

The Gnomon or Substile of a Post or Horizontal Dial, should point directly South, and its Back will be then directly North. The South may be truly known by a good Watch or Clock, just at Noon; for then the Sun is always at the Meridian, and makes just 12 a Clock: so that knowing the South, it will not be difficult to find the North, it being its opposite.

To fix a Dial North and South.

Fasten your Board on the Top of a Post, and then with your Compasses make 4, or 5 or 6 Circles, one within the other, from the Centre or Middle, where place a large Pin perpendicularly or upright, and nicely observe, when the Sun shines in the Forenoon, on which Circle the Head of the Pin shadoweth: then there make a Mark; and do the same in the Afternoon, when the shade of the Pin's-Head comes on the same Circle; and from the Midway of the two Marks, draw a Line to the Centre, on which place your Meridian or 12 a Clock Line; so will the Post-Dial point North and South.

By the Meridian-Line, you may also know when the Moon, or a Star of Magnitude, comes to the South; which when they do, they are always at the Highest, whether by Night or Day.

Before the Figures or Representations of Dials, it may not be amiss to give the Sense and Meaning of some few Terms used in Dialing, Geography, &c.

Horizontal, belonging to the Horizon; which is that Circle that terminates the Sky, and a Boundary to our Sight, and divides the upper Hemisphere from the Lower, being the Line in which the Sun always rises and sets.

Equinoctial Line, or *Equator*, A Line going through the Middle of the World, and equally distant both from the North and South Poles, in which Line the Sun

Sun

Sun circleth on the 10th of *March*, and 10th of *Sept.* and then makes the Days and Nights of equal Length.

Tropicks, are Two imaginary Circles on the Globe, for the Bounds of the Sun's Course ; as was spoken of before.

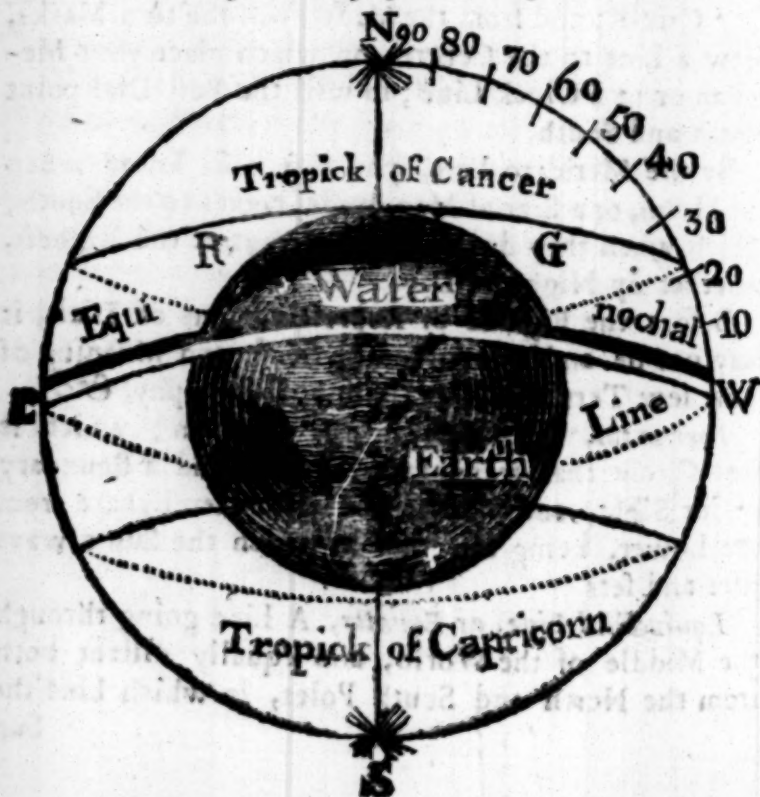
Meridian, Another imaginary Circle passing through the Poles and the Zenith, and being touched by the Sun makes Noon-day.

Zenith, Is the Point directly over our Heads.

Nadir, Is the Point opposite to the *Zenith*, and directly under our Feet.

Zodiack, Another imaginary Circle on the Globe, containing the Yearly Course of the Sun through the 12 Signs, viz. *Aries*, *Taurus*, *Gemini*, *Cancer*, *Leo*, *Virgo*, *Libra*, *Scorpio*, *Sagittarius*, *Capricornus*, *Aquarius*, and *Pisces*.

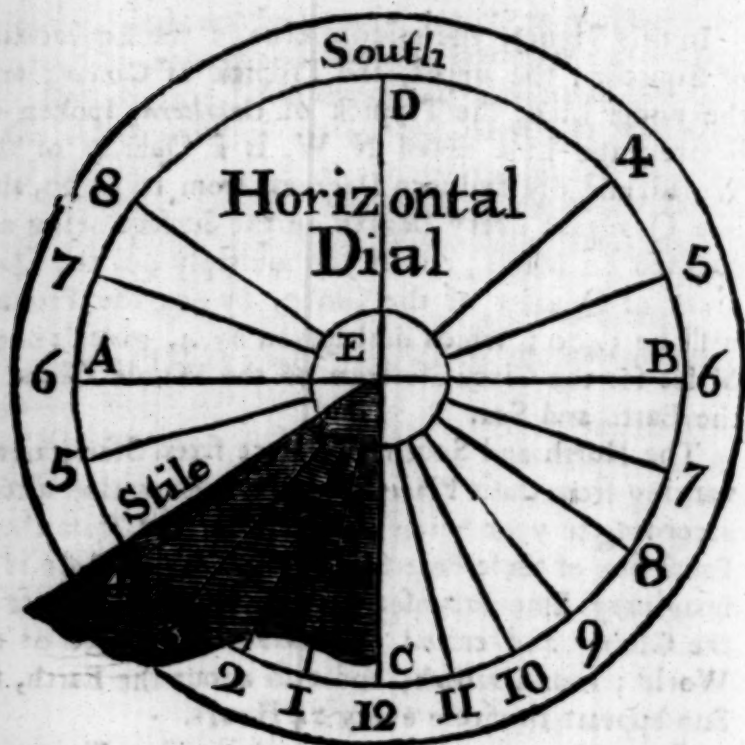
A small Representation of the Globe.



In this Figure, the middle Line is the Equinoctial or Equator; the upper, the Tropick of *Cancer*; and the under Line, the Tropick of *Capricorn*, spoken of before; the Line noted N. W. is a Quarter of the World, and divided into Degrees, from 10 to 90, and is a Quadrant every Degree on the Surface being accounted 60 Miles; and if you multiply 90, the Quadrant or Quarter of the Globe, by 60, the Product will be 5400; which multiplied by 4, gives 21600 Miles for the Circumference of the Whole Globe of the Earth and Sea.

The North and South Poles are fixed Stars, never varying from their Places; but their Elevation alters, according to your being nearer or farther from them. From one of these Pole-Stars to the other, there is an imaginary Line supposed to pass thro' the Centre of the Globe, and called the Axis or Axel-tree of the World; round which, and also about the Earth, the Sun appears to circle every 24 Hours.

But to return to Dialing, the following Figure, represents a Horizontal Dial.



First, with a Ruler draw the Line A B, then cross it in the Centre with another Line, as the Line C D, which is the Meridian or 12 a Clock Line ; and the first Line drawn, viz. A B, is the 6 a Clock Line ; Then open your Compasses, and place one Foot at the Beginning of the Degrees, or the Arch Edge of your Quadrant, and extend the other Foot to 60 Degrees, and with that Extent place one Foot in the Centre of the Dial, at E, where the two first Lines drawn cross one another, and draw the Semi-circle A C B.

Next having the 12 a Clock Line E C, to know what distance must be set off from it, for 1 a Clock and 11 a Clock, being all one ; be directed by the following small Table, viz.

52			
D.	M.	Hours	
11	55	1	11
24	26	2	10
38	13	3	9
53	44	4	8
71	9	5	7

In the first Column against 1 Hour and 11, you find 11 Degrees and 55 Minutes; which take off the Edge of the Quadrant, by setting one Foot of the Compasses at the Beginning of the Divisions under B, and the other Foot to 11 Degrees and near a small Part; the Compasses so opened, at one Foot in the Circle at the Bottom of the 12 a Clock Line, and with the other Foot of the Compasses make a Mark in the Circle both towards A and B, and from those two Marks draw Lines towards the Centre, which you may afterwards go over with Ink. Then to make the Hour-Lines for 2 and 10 a Clock, look in the Table for 2 and 10 Hours, against which you will find 24 Degrees and 26 Minutes, which take off the Degrees of your Quadrant, and mark as the other from the 12 a Clock Line both Ways in the Circle.

Note, The same is to be done for 3 and 9 a Clock, and also for 4 and 8 a Clock; and the like for 5 and 7 a Clock; and for 5 and 7, 4 and 8, above the 6 a Clock Line, set off the Distances as below it.

Then for the Height of the Gnomon or Stile, admit 52 Degrees, take it off the Edge of the Quadrant with the Compasses as before, and with that Extent set one Foot at Bottom of the 12 a Clock Line, as before, and extend the other Foot in the Circle, and make a Mark,

R

and

and then draw a Line from thence to *B* the Centre, for the upper Edge of the Stile, and so raise it directly over the Meridian or 12 a Clock Line.

Before I proceed farther, two or three Things should be shewn, as being essentially necessary to be known, because this Art hath great dependence on them. And first,

Upon a right Line given, to erect a Perpendicular, as in Figure the 14th.

Let *CD* be the Line given to have a Perpendicular on it from *B*; with the Compasses (open'd at a small convenient Distance) place one Foot in the Point *B*, and with the other make the two Marks *E* and *F*, on either side of *B*; then open the Compasses to a more large and convenient Distance, and make the Arch *GG*, by setting one Foot in *E*, and as near as you can over the Point *B*; then (the Compasses being open at the same Distance) place one Foot on the point *F*, and describe the Arch *HH*, crossing the former at the point *A*; thro' which Intersection with a Ruler draw the Line from *A* to *B*, which will be Perpendicular to the Line *CD*.

How to raise a Perpendicular on the End of a Line.

This is effected several Ways; but I shall instance only two, which are very easy.—See Figure 15.

First Method.

Suppose the Line *AB* be given to raise a Perpendicular towards the End.

First open your Compasses to any small Distance, and set one Foot in the Point *A*; and with the other, describe the Arch *FED*; then with one Foot of the Compasses in *D* (they being opened to the same Distance) cross the Arch in *E*; and then setting one Foot in *E*; with the other make the Arch *AFG*, crossing the first Arch

Arch in F. Again, Set one Foot in F, and with the other describe the small Arch HH , crossing the former in the Point C ; so the Line AC being drawn, is the Perpendicular required.

The second Method.

Admit B be the Point given on which to draw the Perpendicular BI . Open the Compasses to any small Distance; and setting one Foot in the Point B , pitch down the other Foot at random, as suppose at K ; then the Foot resting in K , turn the other about till it cross the Line AB in L ; then draw the Line KL , and set the same Distance KL (at which the Compasses already stand) from K to M ; so a Line drawn from B , thro' M , is the Perpendicular on the End of the Line AB .

How to divide a Right Line into two equal Parts, and at Right Angles : as in Figure the 16th.

Suppose the Line AB be given to be divided into two equal Parts, at Right Angles. Take in the Compasses any Distance above half the Length of AB , and setting one Foot in the Point A , with the other draw the Arch CDE ; then (the Compasses unaltered) set one Foot in B , and with the other cross the former Arch both above and below the Line; in the Points F and G ; then a Line drawn from F to G shall intersect or cut the given Line in H , and divide the Line AB into two equal Parts, and at Right Angles.

Again, A Line being given, how to draw another Line parallel thereunto, at any Distance required, or through any Point assigned.

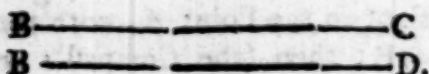
Of Parallel Lines there are two Sorts, viz. *Streight* or *Circular*. All Circles drawn on the same Centre,

whether greater or lesser one than the other, are said to be Parallel or Concentrick, that is, having one common Centre, as in Figure the 17th.

In this Figure, the Circle A B C D is concentrick or parallel to the Circle E F G H, because both of them are drawn from the same Centre. The Line A C is the Diameter of the greater Circle, and the Line E G of the lesser Circle. And all Right Lines drawn from the Centre to either of the Circumferences, are equal with Respect to their Periphery ; and such Lines are called half Diameters, and sometimes the Radius of the Circle, and will divide the Circle into 6 equal parts, each containing 60 Degrees, and the whole Circle 360 ; into which all the great Circles of the Sphere are supposed to be divided.

Of Parallel Right Lines.

Right lined parallels, are Lines drawn on a plane of equal Length and Distance ; and tho' infinitely extended will never meet, but in all parts retain an equal Distance, such as these underneath.



To draw a Right Line Parallel to another Right Line, at a Distance given : as in Figure the 18th.

Take in your Compasses the given Distance G H, then setting one Foot in E, draw the Arch I K ; then moving to F, describe the Arch L M ; then laying a Ruler on the Top of the two Arches, just touching them, draw the Line N O, which will be parallel to the given Line E F.

To bring any three Points (not in a straight Line) into a Circle, by finding the Centre, so that the Circle shall pass thro' those Points : as in Figure the 19th.

Let the three Points given be A B and C, through which it is required that a Circle be drawn. First set one Foot of the Compasses in one of the given Points, as suppose in A, and extend the other Point to B, another of the Points, and draw the Arch of a Circle G F D; then (the Compasses not altered) set one Foot in B, and with the other cross the said Arch with two small Arches, in the Points D and E, and draw the Line D E; thirdly, set one Foot in C, (the Compasses being at the same Distance) and with the other Foot cross the first Arch G F D, in the Points F and G, and draw the Right Line F G, crossing the right Line D E in the Point O, which is the Centre sought for; in which, place one Foot of the Compasses, and describe the Circle at the distance O A, and it passes through all the given Points A B and C.

How to make a Line of Chords Geometrically to any assign'd Length or Radius.

Since in the Art of Dialling, there is frequent Use made of the Line of Chords, it is proper here to shew the making thereof.

A Line of Chords is 90 Degrees of the Arch of a Circle, transferred from the Limb of the Circle to a straight Line; now every Circle, whether great or small, is divided (or supposed so to be) into 360 equal Parts, called Degrees; so the Semi or half Circle contains 180, the Quadrant or quarter 90, and the Radius or Semi-diameter (which is that Line on which the Circle or Semi-circle is drawn or described) noted in Figure the 20th of the *Line of Chords*, with the Letters

ters A B, is always equal to 60 Degrees of that Circle which it describes, and therefore 60 Degrees of a Line of Chords is called the Radius thereof.

To make the Line of Chords : as in Figure the 20th.

First draw a Line of any Length, as C B D, and on the Middle thereof draw the Perpendicular A B; next open your Compasses to the Radius or Length that you would have your Line of Chords to be of; which admit A B, and with that Distance on B as the Centre, describe or draw the Semi-circle C A D, which is divided into two equal Parts or Quadrants by the Perpendicular Line A B; thirdly, divide the Arch or Quadrant A R D, into 90 equal Parts or Degrees; which is done by taking the Length of the Line A B, and setting that Distance on the Quadrant A D, and from D to R; so is DR 60 Degrees, and A R 30 Degrees; then take the Distance A R, and set it from D to S, so is the Quadrant divided into three equal Parts, at the Points S and R, each containing 30 Degrees: This done, divide the several Spaces between A R, R S and S D, into three equal Parts, each of which will be 10 Degrees, according as the Numbers are seen, and set apart to them: And these again divided into two equal Parts, each part contains 5 Degrees; and every of those into five smaller, as in the Representation; and so the whole Quadrant is divided into 90 Degrees. Fourthly, the Quadrant A R S D being thus divided into 90 Degrees, set one Foot of the Compasses in D, and open the Foot to A, and describe the Arch A E F, touching the Line C D in F; so is the Point F, upon the right Line C D, the Chord of 90 Degrees. Fifthly, Open the Compasses from D to 80 Degrees, and describe the Arch 80 G H; so shall the Point H be the Chord of 80 Degrees. Sixthly,
Open,

Open the Compasses from D to 70, describe the Arch 70 I K, so is K the Chord of 70 Degrees. Again, open the Compasses from D to R, the Radius, or 60 Degrees, and describe the Arch R L B, so is B the Chord of 60 Degrees, equal to the Radius. Do the same by 50, 40, 30, 20, and 10, and then you will have the Line D F divided into 90 unequal Parts, called Chords, as in Figure 20.

Thus much for the Line of Chords, frequently made use of in Dialling, where there is not the conveniency of having a Mathematical Instrument-maker near at Hand.

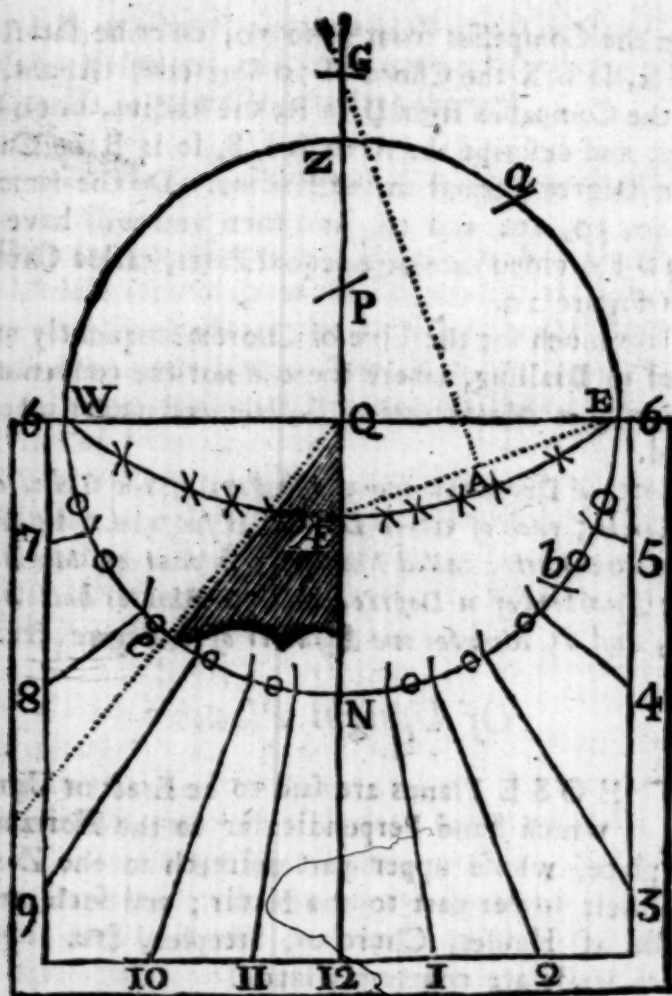
Note, *A Degree is the 360th Part of the Globe, or of any Circle; each of which Degrees is supposed to be divided into 60 Parts, called Minutes; so that 45 Minutes is three Quarters of a Degree, and 30 Minutes half a Degree, and 15 Minutes one Quarter of a Degree, &c.*

Of Upright Planes.

THOSE Planes are said to be Erect or Upright which stand Perpendicular to the Horizon of the place, whose upper part pointeth to the Zenith, and their lower part to the Nadir; and such are the Walls of Houses, Churches, Steeples, &c. against which Dials are commonly made.

Of upright or erect Planes, there are two Sorts, viz. *Direct* and *Declining*.

How to draw the Hour-Lines on a direct South Plane, in the Latitude of 51 Deg. 32 min. as described by the following Representation.



First draw the Circle Z E W N, representing an upright direct South Plane ; next cross it with the Diameters Z Q N, for the Meridian or 12 a Clock Line ; and W Q E for the prime vertical Circle, or Hour Line of Six.

Secondly, out of your Line of Chords take 38 Degrees 28 Minutes (the Complement of the Latitude of the Place) and set that Distance on the Dial-plane from Z to a, and from E to b, and from N to c.

Thirdly,

Thirdly, Lay a Ruler from W to *a*, and it will cut the Meridian, Z N in the Point P, the Pole of the World ; and a Ruler also laid from W to *b*, will cut the Meridian in *Æ*, which is the Point thro' which the Equinoctial must pass ; for the drawing of which, you have 3 Points given, *viz.* E *Æ* and W, and the Centre will always be in the Meridian Line Z N.

Fourthly, Divide the Semi circle E N W into 12 equal Parts, at the Points OOO &c.

Fifthly, Lay a Ruler to Q and each of those Points OOO, and the Ruler will cross the Equinoctial Circle in the points *** &c. dividing that into 12 unequal parts.

Sixthly, Lay a Ruler to P (the pole of the World) and every one of the Marks *** &c. and the Ruler will cross the Circle of the plane in the points ||| &c.

Lastly, If through the Centre Q and the respective points ||| &c. you draw right Lines, they will be true Hour-lines of an erect direct South-plane.

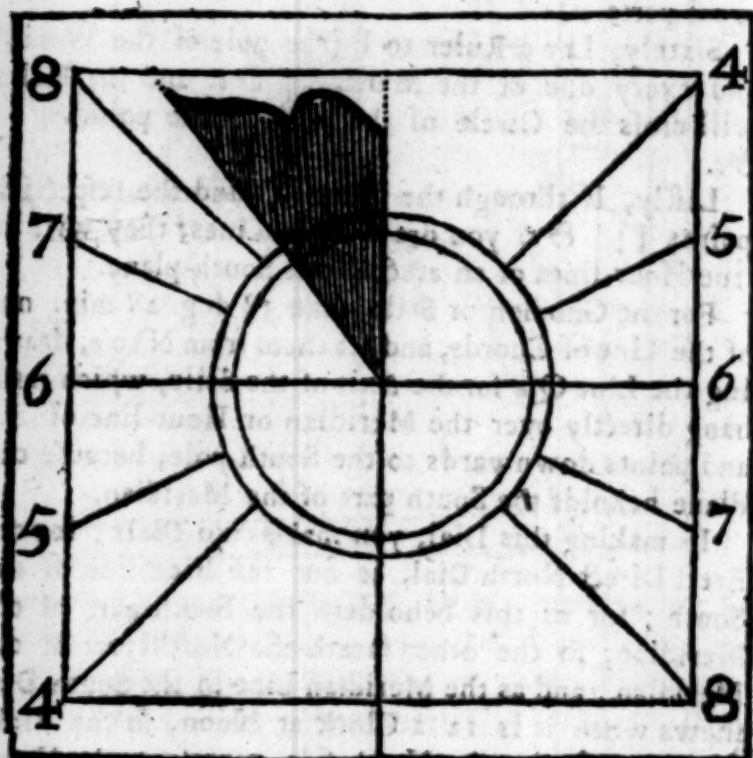
For the Gnomon or Stile, take 38 deg. 28 min. out of the Line of Chords, and set them from N to *e*, drawing the Line Q *e* for the Axis of the Stile, which must hang directly over the Meridian or Hour-line of 12, and points downwards to the South-pole, because the Plane beholds the South part of the Meridian.

In making this Dial, you make two Dials ; for the Erect Direct North Dial, is but the Back-side of the South ; for as this beholdeth the South-part of the Meridian, so the other faceth the North-part of the Meridian ; and as the Meridian Line in the South-Dial shews when it is 12 a Clock at Noon, so the Back-side thereof, *viz.* the North-side, represents the Hour-line of 12 a Clock at Midnight, and therefore not expressed, nor the Hour-lines of 9, 10, 11 at Night, or of 1, 2, or 3 in the Morning, the Sun being never

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seen by us above the Horizon at those Hours : so that the North Dial is capable of only receiving the Hours of 4, 5, 6, 7 and 8 in the Morning, and of 4, 5, 6, 7 and 8 at Night; and (in this Latitude) not all of them neither ; for it shines not in this Plane at 8 in the Morning, nor at 4 in the Afternoon ; but it is best to put them down, as in the Figure following, to know how much it is past 7 in the Morning, and what it wants of 5 in the Afternoon.

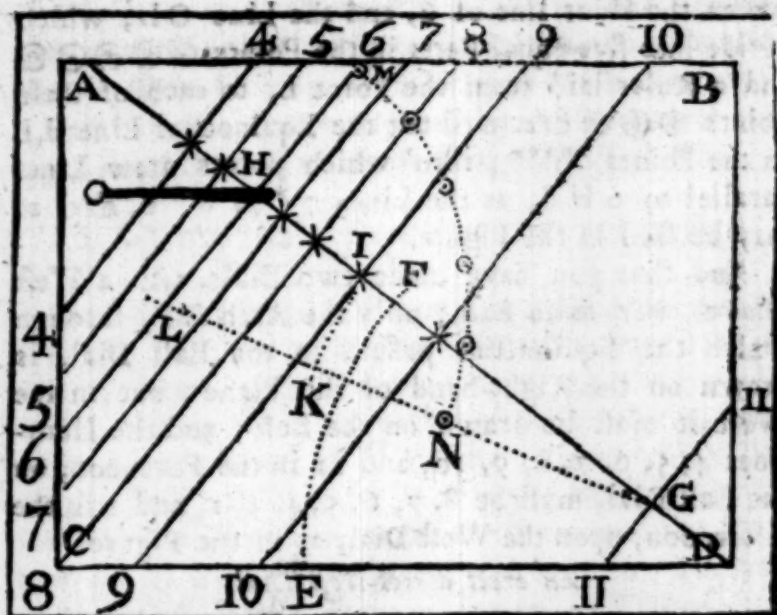
An Erect Direct North Dial.



To

To draw the Hour-Lines on an erect direct East or West Plane.——Hour-Lines in these Dials must be parallel to one another, and the Dial not have any Centre, but drawn as follows.

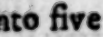
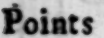
An East direct Dial, in the Latitude of 51 deg. 32 min.



Let A B C D be the Dial Plane, on which is to be drawn a direct East Dial, upon the Point D, if an East Dial ; and on the Point C, if a West. With the Radius (or 60 Degrees) of the Line of Chords, describe the obscure Arch E F ; then from your Chords take 38 Deg. 28 Min. the Complement of the Latitude of the Place, and set them from E to F, and draw the Line D F quite thro' the Plane ; then that you may proportion the Stile to the Plane, so that you may bring on all the Hours from Sun-rising to 11 a Clock, assume two Points in the Line F D ; one towards the End D (as the Point G) for the Hour-Line of 11, and another at H, for the Hour-Line of 6 ; and thro' the

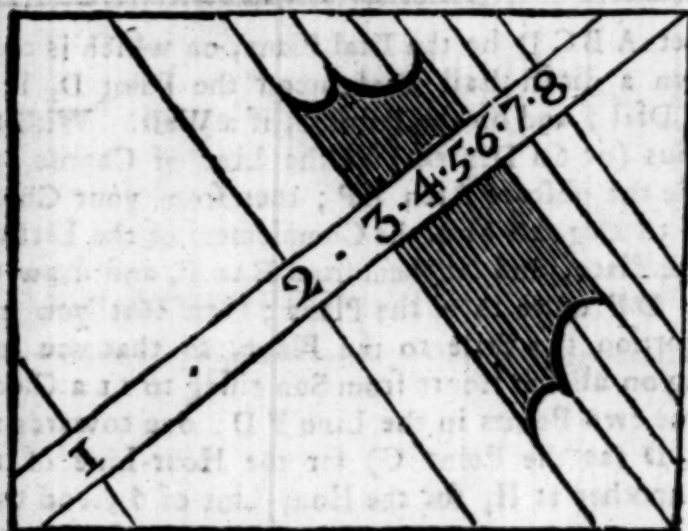
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the Points G and H, draw the Lines 11 G 11, and 6 H 6, in the Point L: so shall L H be of the Height of the Perpendicular Stile proportioned to this Plane.

For the drawing of the Hour-lines, set one Foot of the Compasses (opened to 60 Degrees of the Chords,) in L, and with the other describe the Arch M N, between the Hour-line of 6, and the Line G L; which divide into five equal Parts in the Points  and a Ruler laid from the Point L, to each of these Points  &c. will cut the Equinoctial Line H L in the Points *****; thro' which points draw Lines parallel to 6 H 6, as the Lines 7 * 7, 8 * 8, &c. as may be seen in the Figure.

And thus you have made two Dials, viz. a West Dial as well as an East; only the Arch E F, through which the Equinoctial passeth in the East Dial, is drawn on the Right-hand of the Plane; but in the West it must be drawn on the Left; and the Hour-lines 4, 5, 6, 7, 8, 9, 10, and 11 in the Forenoon, on the East-Dial, must be 8, 7, 6, 5, 4, 3, 2, and 1 in the Afternoon, upon the West Dial, as in the Figure.

An erect direct West Dial.



The stile of the East or West Dials, may be either a straight Pin of the just length of the line H O in the other Figure, which is equal to H L in the East Dial fixt in the point H, on the Hour-line of 6, and exactly perpendicular to the Plane, shewing the Hours by the shadow of the Apex, or very near the Top thereof: Or, it may be a Plate of Brass of the same Breadth with the distance of the Hour-lines of 6 and 3; which Plate must be set perpendicular upon the Hour-line of 6, and so it will shew the Hour by the shadow of the upper Edge thereof, as in the foregoing West Dial.

An easy Way how to fix a Dial North and South.

Fix a square Piece of Board like a Trencher on the Top of a Post, and with your Compasses draw 4, 5 or 6 Circles one within another from the Centre; in which Centre fix a large Pin perpendicularly, and when the Sun shines in the Forenoon, note which Circle the Pin's head shadeth, and there make a Mark: Do so in the Afternoon, when the shadow of the Pin's head comes on the same Line; and from the Midway of those two Marks, draw a Line to the Centre; upon which Line lay your 12 a Clock or Meridian-line of your Post Dial, because it directly points North and South. Thus by this plain Way, without any other Instrument, find the situation of your Dwelling, whether full North or South, or whether it declines East or West, &c.

Of Beautifying and Colouring Dials.

FIRST the Boards are to be brushed over with Linseed Oil, thinly ground with Spanish Brown, done over 3 or 4 times (drying between each time a little

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little thicker each time with the Colour : and this is called *Priming*.

To make the Fat Oil for Dials.

Boil Red Lead, and Linseed Oil, and a little Li-charge of Gold (about a Pennyworth) together, till almost as thick as Syrup ; and, when cold, and well settled, pour the clearest into a Bottle or Bladder for use.

The Gold Size for Dials.

Mix fine ground yellow Oaker with the aforesaid fat Oil, to such a Consistency as when used it may settle smooth of its self.

A Mixture for Hour Lines.

Grind Vermillion or Lamp-black with the fat Oil.

To draw golden Letters or Figures for the Hours,

First draw them with a Pencil dipt in the Gold Size before-mentioned ; which when so dry as just to stick to your Fingers then with a smooth-edg'd Pen-knife shape your Leaf-Gold to your Mind ; take it up with a piece of Cotton Cloth fixt to the End of a stick, and lay it on the Size, pressing it down with the same Cotton, and, when dry, brush off the loose Gold with a Feather, and smooth the rough Edges of the Letters with a Pencil dipped in red or black Colour:

Of the Dial Plain.

Let the Board be of the best season'd firmest clearest Oak, one, two or more Foot square, and about three Inches thick. Take two Boards, and get them planed on both sides, and then laid in the Sun-shine, or near a moderate Fire 2 or 3 Days together ; then plane them again and fix them with good Joints ; and fasten them in gluing with wooden Pegs, as I have seen Coopers fix their Pieces of Heading for their Casks ; and when thus glued and dried, plane them again, and then fasten them, by nailing two small Plates of Iron or Tin on the Back.——If you cannot get seasoned Wood, but green ; then boil it about an Hour in Water,

Water, to make it fough, and keep it from warping. In the general, Wood is accounted better than Stone, because it keeps the Colouring more stanch or firm.

Before you colour your Dial Plate or Board, fix your Iron Stile of 38 Degrees (which indifferently serves for all *England*;) and having marked your Hour-Lines with Ink, and fastned a Nail at the End of each Hour-Line, that the Head of each Nail may shadow or direct you to the Centre when it is coloured. And as it may happen that Golden Letters or Figures may decay in a few Years, you may on that Account make them with White-lead-paint, pointed with Red in a Black Margin.—— When your Dial is finished, and dry, dip a Feather in your Oil, and anoint it thinly; for the finer you mix or grind the Colouring with the Oil, the more beautifully it appears, tho' not so lasting.

These Hints of Colouring of Dials, puts me in mind of some other necessary Touches, relating to sundry Mixtures of Colours, and Dying of Stuffs, &c. collected from Mr. *Salmon's Polygraphice*.

Of Colours, and Dying.

Whites, are Ceruse, Flake-White, and White-Lead.

Blacks, are Lamp black, Burnt Cherry-stones, and old Ivory burnt.

Reds, are Read Lead, Vermillion, Red Oaker, and Indian Lake.

Greens, are Verdigrease. Verditure, and Sap-green made of the Juice of Buethorn-berries.

Yellows, are Saffron, yellow Pink, and Gambogia.

Brown, is UMBER burnt.

Gold-Colour, is Orpiment.

Again, *Verdigrease*, with a little Sap-green, makes a good and a right Green.

Blue,

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Blues, are Ultramarine, Smalt, Indico, and blue Bice.

Of mixing Colours.

Colours are mixt by being ground on a Stone with fair Water severally, and dryed, and keep in Paper Bags for use ; except Lamp-black, Saffron, Smalt, Gambogia, and Sap-green.

Blue ; to compound, temper a little Indigo and Smalt with Oil.

A Light Blue ; mix Smalt and White-Lead together.

Red Colour ; mix Lamp-black and White-Lead together, on a Marble.

A Fox-Colour, is Umber burnt.

Gold Colour, is Orpiment mixt with fat Oil, by a Knife on an Earthen Plate, or Gally Tile rather.

To hinder Colours from cracking, put Oil of Wall-nuts to them.

Yellow Colour ; beat Saffron to Powder, and steep it in Vinegar,—Or take the Yellow Chives in White Lillies and Gum Water mixt for Writing.

Red ; Vermilion with Gum-water mixt for Writing.

Golden Letters ; to write, mix Vermilion and Gum-Armoniack with Yolks of Eggs.

Of Dying Wooll, Stuffs, &c.

To die *Blue*, Take Woad 1 pound, and mix it with 4 Pints of boiling Water, and dip Whites in it 24 Hours.

To die *Red* of a clear Colour, Take 60 Pints of Water wherein Brann has been steeped 24 Hours, and, when strained, dissolve 2 pound of Allom, and 1 lb. of Tartar ; in which Water boil what you have to Die for 2 Hours ; then take it out, and boil it in half as much Fresh Water made of Brann, viz. 30 Pints

Pints; to which add Madder 3 pound, and so perfect the Colour with moderate Warmth, without Boiling.

To die *Green*, First make it a Yellow by the Direction underneath; then take 60 Pints of Water wherein Brann hath been soaked, as aforesaid; then strain it, let 3 lb. of Allom be dissolved in it, and then boil what you have to die in it, for 2 Hours.

To die *Tellow*, Take Woad 2 pound of the said Water of Brann, and boil till the Colour is good.

And if you would have the said *Tellow* to be *Green*, put the stuff into the aforesaid *Blue Die*.

To die a *Sad Colour*, add Logwood to the *Blue Die* before-mentioned.

To die Linnen or Thread, &c. like Red: Take Powder of Brazil, and Vermilion, of each 1 Ounce, boiled in Allom-water.

To die Linnen or Thread Yellow; Dissolve Gombogia in Allom-water, &c.

To stain Skins Blue: Boil Eldern-Berries, and with the Liquor brush over the Skins, and wring them; then boil the Berries in Allom-water, and wet them twice over.

A Hint of Generals, or Things proper to be known and remembered on proper Occasions.

A Ream of Paper, 20 Quires.

A Quire of Paper, 24 or 25 Sheets.

A Bale of Paper, 10 Reams.

A Role of Parchment, 5 Dozen, or 60 Skins.

A Dicker of Hides, 10 Skins.

Ditto of Cloves, 10 Dozen pair.

A Last of Hides, 20 Dickers.

A Load of Timber unhewed, 40 Foot.

A Chal-

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A Chaldron of Coals, 36 Bushels.

A Hoghead of Wine, 63 Gallons.

Ditto of Beer, 54 Gallons.

A Barrel of Beer, 36 Gallons.

Ditto of Ale, 32 Gallons.

A Gross, 144 or 12 Dozen.

A Weigh of Cheese, 256 Pounds.

Days in a Year 365, Weeks 52, and Hours 8766.

Pence in a Pound 240, Farthings 960.

An Acre of Land 160 Square Poles or Perches.

A Last of Corn or Rape Seed, 10 Quarters.

Ditto of Pot. Ashes, Cod Fish, white Herrings, Meal, Pitch, and Tarr, 12 Barrels.

Ditto of Flax and Feathers 17 C. of Gun-powder 24 Barrels, or 2400 lb. Of Wool, 4368 lb.

A Tun of Wine, 352 Gallons ; Oil of Greenland, 252 Gallons ; and sweet Oil of Genoa, 236 Gallons.

A Tun in Weight, 20 C. of Iron, &c. but of Lead there is but 19 C. and half, called a Fodder or Fother.

A Todd of Wooll, 28 Pounds.

A Pack of ditto, 364 Pounds.

A Load of Bricks 500 ; and of plain-tiles, 1000.

A Stone of Fish, 8 lb. and of Wooll 14 lb. The same for Horseman's Weight, and also Hay ; But Pepper, Cinnamon, and Allom, have but 13 lb. $\frac{2}{3}$ to the Stone.

Ditto of Glass, 5 Pounds ; and a Seam of ditto 24 Stone.

A Truss of Hay, 56 Pounds ; and a Load of ditto, 36 Trusses.

Note, *New Hay in June and August, ought to be 60 Pound to the Truss ; as per Statute of 2 of William and Mary, 1693.*

A Cade of Red Herrings, 500 ; and of Sprates, 1000. Iron and Shot, 14 lb. to the Stone.

Barrels

Barrels of sundry Commodities.

Anchovies, 30 lb.	Raffins, 1 C. wt.
double Barrel, 60 lb.	Oil, 31 Gallons and half.
Nutts or Apples, 3 Bushels.	Spanish Tobacco, 2 C. to
Pot. ash or Barilla, 200 lb.	3 C.
White or Black Plates, 300	Gun-powder, 1 C. wt.
Candles, 10 doz. lb.	Soap, 240 lb.
Salmon or Eels, 42 Gall.	Butter, 224 lb.
Figs, 3 qrs. 14 lb. to 2 C. $\frac{1}{4}$	Herrings, 32 Gallons.

*Things in Wholesale Trade, Bought and Sold by the
Thousand.*

Cuttle Bones	Bricks
Oranges and Lemons	Clinkers, (or Flanders
Chair Nails	Tiles.)
Tacks and Tenter-Hooks	Billers & Leaves of Horn
Pomgranates and Tazels	Barrel Hoops
Goose Quills & Thimbles	Squirrel Skins
	Slat & Hilling Stones
Pins and small Needles, by the 1000 dozen.	

Things Sold and Bought at Six Score to the Hundred.

Bauks and Barlings	Nails, Eggs, and Cod-fish,
Barrel and Pipe Boards	Cole, Ling, & new Land-
Bomspars and Bow Staves	fish, Stock-fish of all sorts
Canfpars and Caprevans	Ells of Canvas, and most
Herrings and Deal-Boards	Foreign Linnens.
	And Hhd Staves.

Of Money.

THE Currant Coin of this Nation, is made either of Copper, Silver, or Gold. Of *Copper* is made the Farthings, and Half pence. Of *Silver*, the Pennies,
Two

Twopences, Threepences, Groats, Sixpences, Shillings, Half Crowns, and Crowns: But there is very little Silver coined below the Sixpence. Of Gold is made the half Guinea, the Guinea, and the 5 Guinea piece; And of Old Gold, there are Jacobusses of 25 s. and Carolusses of 23 s. marked XX; with half and quarter pieces of each: Besides there are Foreign pieces of Gold, that pass, tho' with some Scruple; as the *Portugal Moidore* at 27 s. and the *Milled or French Pistole* at 17 s. There are also some few ancient pieces of Gold of a pale Colour, as being alloyed with Silver, and therefore may be reckoned the best, and sometimes called Angel or Crown Gold; whereas the Old Gold or broad pieces are mostly alloyed with Copper, which makes them of a redish Colour.

Imaginary Money.

We appropriate several Names to Money, of which there is no Coin; as,

	s.	d.
The Pound of _____	20	0
The Mark _____	13	4
The Noble, or half Mark _____	6	8
The Angel, or _____	10	0

In *England*, Accompts are kept in pounds, Shillings, and Pence *Sterling*; and their Marks are derived from their Names in Latin, viz. *l.* for *Libra* or Pounds, *s.* for *Solidi* or Shillings, *d.* for *Denarii* or Pence, *qr.* for *Quadrantes* or Farthings, 4 making a Penny; and expressed or set down thus,

l. s. d. qr.
4 16 8 2

but better thus, *l. 4--16--8 $\frac{1}{2}$* ; the Mark for Pounds standing before the Sum, denominates the first Number, & the other are known of course; for after Pounds follow Shillings, and after Shillings succeed Pence, &c.

When

Or, The Carpenter's Exact Rule. 381

When the Price of any thing is Shillings and Pence,
it is set down thus,

s. d.

4 6

or thus, 4/6: And when Shillings and Pence, and Parts
of a Penny, expressed thus,

s. d.

4 6 $\frac{1}{2}$

or thus 4/6 $\frac{1}{2}$. The latter Way by some is accounted
the Neater, and best Method to express Parts of a
Penny or Farthings; thus:

$\frac{1}{4}$ a Farthing, or one fourth part of what it follows.

$\frac{1}{2}$ a Half-penny, or one half of what it follows.

$\frac{3}{4}$ three Farthings, or 3-4ths, or qrs of what it follows.

And being thus set Fraction-wise, the under Figure
shews how many Parts the quantity before it is divid-
ed into, and the upper Figure shews how many of
those under parts the Fraction stands for; as thus, $\frac{1}{2}$
of an Ell, $\frac{3}{4}$ of a Foot, or 9 Inches; and the same of
a Shilling is 9 pence: of a pound is 7/6.

If you are to set down 6 Yards and half, write thus:

yds

6 $\frac{1}{2}$

●.

Nineteen Hundred three Quarters thus,

19 $\frac{3}{4}$

Sixteen Pound and a quarter thus,

lb.

16 $\frac{1}{4}$

or else thus, 16 C. $\frac{1}{4}$ 16 lb. $\frac{1}{4}$ 5 Foot $\frac{1}{2}$ 14 days $\frac{1}{4}$ Here
the Name is put between the Whole Number and the
Fraction, which I think is the plainer and better
Way: For Example, 6 $\frac{1}{2}$ hhd may, thro' Ignorance or
Wilfulness, be read, 6 half hhds, as well as 6 hhds
and half; and at a certain place where I have had
Business, the Wharfingers Clerks expressed their half
hhds in this manner.

A Table

A Table of the Value of Gold and Silver.

		<i>l.</i>	<i>s.</i>	<i>d.</i>
Gold	{ 1 pound is worth —————	48	0	0
	{ 1 ounce —————	4	0	0
	{ 1 penny weight —————	0	4	0
	{ 1 grain —————	0	0	2
Silver	{ 1 pound is worth —————	3	0	0
	{ 1 ounce —————	0	5	0
	{ 1 penny weight —————	0	0	3
	{ 1 grain —————	0	0	$\frac{1}{8}$

Instrumental Arithmetick.

AS Problems or Questions in Measurement, &c. are solved or answered Arithmetically by the Pen, so are they also Instrumentally taken by Compasses from certain Lines, &c. on Rules made for that purpose, for the help of those that are deficient in Arithmetick, or for a quicker Dispatch of Business; and such Performances are called *Instrumental Arithmetick*; and of these Instruments, the most in Vogue or use, are these Three: 1. The Carpenters plain Rule. 2. Gunter's Line. 3. Coggeshall's Sliding Rule.

1. *The Carpenters Plain Rule.*

I shall describe and say something of the *Carpenter's plain Rule*, in relation to its Uses, &c.

Its Description.

This Rule is made use of in Measuring Board and Timber, being two Foot in length, and divided into Twenty-four Parts or Inches, and every one of those Parts or Inches sub-divided into half Inches, and each of those Halves into Quarters, and each Quarter into two Parts; so that every Inch is divided into eight Parts, and the Whole Length into 192 Parts.

This

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This Rule is well known, and therefore not absolutely necessary of Representation: but however, for the better understanding it, I shall give one, thus:

Under Board-Measure thus described.	1	2	3	4	5	6	1	7
	12	6	4	3	2	2		
	0	0	4	0	4	0		

This Line begins at 6, and goes on to 36, within 4 Inches of the End of the Rule on the Right-hand.

Its Use.

In. deep	Feet In. Pts.	
a Board { 1	12 0 0	} in length make a Foot square.
2	6 0 0	
3	4 0 0	
4	3 0 0	
5	2 4 5	
6	1 0 0	

By this Table it is manifest, and easily understood, That a Board of 4 Inches requires 3 Foot in length to make a Foot square, and a Piece of 3 Inches broad will require 4 Foot in length to make a Foot square, &c.

At the other End of this Rule is a Table called *Under Timber-Measure*; and thus described:

1	2	3	4	5	6	7	8
144	36	16	9	5	4	2	2
0	0	0	0	9	0	11	3

This Line begins at 8 and half, and goes on (by Divisions) to 36.

In,

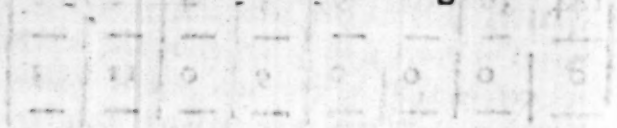
	In. square.	Foot	
If a Piece of Timber be	1	144 , 0	} in length make a Foot solid.
	2	36 , 0	
	3	16 , 0	
	4	9 , 0	
	5	5 , 0	
	6	4 , 0	
	7	2 , 11	
	8	2 , 3	

By this Table 'tis plain, That if a piece of Timber 6 Inches square, then 4 Foot in length of that piece will make a solid Foot.

It is a common Method with *Carpenters*, to add the Breadth and Thickness of a piece of Timber in Inches together, and call the half thereof the Square of that Piece ; but this Method gives the Content more than it is ; and the greater the Difference, the larger the Error. But the true square may be found in *Gunter's Line*, thus ; place one point of the Compasses upon the Line for the Breadth, and the other point for the Thickness, half way of that Extent, and that will be the true Square in Inches.

2. *Gunter's Line.*

This Line is commonly set on the Carpenter's plain Rule, and consists of two Lines, one set at the End of the other, and Distances taken by Compasses, as afore-said ; and it is somewhat of the following Form.



Gunter's Line.

To prove the Line by the Compasses, observe,

1 to 2	equal	2 to 5
5 to 10	Distance	4 to 8
4 to 8	to	3 to 6

To Number on the Line.

Observe, That Figures 1, 2, 3, 4, 5, 6, 7, 8, 9, sometimes signify themselves simply or alone; at other times, 10, 20, 30, 40, &c. Again, at other times, 100, 200, 300, or 1000, &c.

To find a Number on the Line, as suppose 134.

For the Figure 1; account 1 on the Line; and for 3, take 3 of the large Divisions; and for 4, take 4 of the smaller Divisions; and that is the Point. Again, to find 750 on the Line: for 7 take 7 on the Line, for 50 take 5 of the greater Divisions, and that is the Point.

To find a small Number on the Line; as suppose 12.

For 1, take one as before, and for 2 take 2 of the large Divisions, and that is the Point.

In Measuring Board or Timber, it is best to have a Line of 2 Foot long, and Compasses one Foot long

S

Note,



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Note, Let the Measurement be by the Inch, Foot, Yard, Pole, Rod, &c. it is best to have it Decimally divided, or so supposed, that is, into 10 parts, as the Measurement shall require, and on the Carpenters Rule, the Foot is so divided.

Note also, That if the Point of the Compasses fall off the Line in the Work, remove it to the same Figure or Place on the other Line; and the lesser Extent you take with the Compasses, is frequently the best.

Multiplication by the Line.

To multiply 5 by 7, Set one Foot of the Compasses in 1. and Extend the other to 5 Upwards, and with the same Extent place one Foot in 7, and the other Foot will fall on 35 the Answer.

Division by the Line.

Example 1. Divide 63 by 3; Extend from 3 to 1 downwards, and the Extent will reach the same Way from 63 to 21 the Quotient.

N. B. In Multiplying, you must always Extend Upwards, that is, from 1 to 2, 3, 4, &c. and, on the contrary, in dividing, Extend Downwards.

Example 2. Divide 288*l.* equally among 16 Men: Extend from 16 to 1 Downwards; and that Extent, will reach the same way, from 288*l.* to 18*l.* for each Man. Again,

Example 3. Suppose 750*l.* were to be divided among 25 Men: Extend from 25 to 1 Downwards; and that Extent will reach the same way, from 750 to 30*l.* each Man's Share.

Rule

Rule of Three Direct.

Example 1. If a Bushel of Barley cost 3*s.* what will 40 Bushels? Extend from 1 to 3 Upwards, and that Extent will reach the same way from 40 to 120 Shillings the Answer.

Example 2. If one Ell of Holland cost 3*s* 6*d.* what will 40 Ells cost? Extend from one to 3 and half Upwards; and that Extent the same way will reach from 40 to 140*s.* the Answer.

Rule of Three Inverse.

Example 1. Admit the Bushel of Wheat to be worth 3*s.* 4*d.* or 40*d.* and then the two penny Loaf to weigh, 20 oz. what shall the said two penny Loaf weigh when Wheat is worth 5*s.* the Bushel? Extend from 60 to 20 Downwards, and that Extent the same way will reach from 40 to 13 Ounces and $\frac{2}{3}$ for the Answer.

Example 2. If 136 Workmen fortify a Place in a Month or 28 Days, how many must be Employed to do it in eight Days? Extend from eight Downwards, to 136, and that Extent the same way will reach from 28 to 476 Workmen, the Answer.

The Use in Board Measure.

Example. If a board be 9 Inches Broad, and 19 Foot long, what is the Content in superficial square Feet? Extend from 12, (the Center of Foot Measure) to 9 Downwards, and that Extent the same way will reach from 19 to 14 Foot and $\frac{1}{4}$.

In Timber Measure.

Example. A Piece of Timber 24 Inches square, and 8 Foot long, what is the Content in solid Feet? Extend from 22 (the Center) to 24 Upwards, and that Extent twice the same way will reach from 8 to 32 Foot the Content.

To find the true Square of a piece of Timber, is to place one Foot of the Compasses upon the Line for the Breadth, and the other Foot for the Thickness, in the Midway of that Extent, and that is the true Square in Inches.

Brick Work.

How many Rods of Work are there in 4035 Feet; Extend from 272 Downwards to 2, and that Extent the same way from 4085, will reach to 15 Rods the Answer.

3. *Coggeshall's sliding Rule.*

The next Instrument I shall speak of, is that which goes by the Name of *Coggeshall's sliding Rule*. And first of

Its Description.

This Rule is framed 3 Ways; sliding by one another as the Glasiors Rules: sliding on one side of a two foot joint Rule; and one part sliding on the other, in a foot of Length; the back Part being flat, on which are sundry Lines and Scales.

Upon the aforesaid sliding side of the Rule, are four Lines of Numbers, Three are double Lines, and one a single Line of Numbers, Marked (as in the Representation by and by annexed) with A B C and D, the Three marked A B and C, are called double Lines of Numbers and Figured 1, 2, 3, 4, 5, 6, 7, 8, 9. Then 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10, at the End. That marked D, is the single Line of Numbers, and

Figu-

Figured 4, 5, 6, 7, 8, 9, 10, 20, 30, and at the End 40, even with and under 10, in the double Line next to it, and that is called the Girt Line, and so marked in the Figure.

The Figures on the three double Lines of Numbers, may be increased or decreased at pleasure; thus 1 at the Beginning may be called 10, 100, or 1000; the 2 is 20, 200, or 2000; so that when 1 at the beginning is 10 then 1 in the middle is 100, and 10 at the End is 1000, but if one at the beginning is counted for 1, then one in the middle is 10, and 10 at the End is 100.

And as the Figures are altered, so must the Strokes or Divisions between them be altered in their value, according to the Number of the Parts they are divided into; As thus, from 1 to 2, it's divided into 10 parts, and each Tenth is divided into 5 parts: and from 2 to 3, it is divided into 10 parts, & each Tenth into 2 parts, and so on from 3 to 5; then from 5 to 6 it is divided into 10 parts only; and so on unto 1 in the middle of the Rule, or the first part of the double Line of Numbers. The second Part or Radius, is divided like the first Radius.

The Girt-Line marked D, is divided from 4 to 5 into 10 Parts and each Tenth into 2 parts, and so on from 5 to 10; then from 10 to 20, it is divided into 10 parts, and each Tenth into 4 parts; and so on all the way from 20 to 40 at the end, which is right against 10 at the end of the double Line of Numbers.

The Lines on the back side of this Rule that slides on one side, are these; viz. a Line of the Inch Measure from 1 to 12, each Inch divided into Halves, Quarters, and half Quarters; another Line of Inch Measure from 1 to 12, each Inch divided into 12 equal Parts and a Line of Foot Measure, being 1 foot, divided into 100 equal Parts, and Figured 10, 20, 30

40

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40, 50, 60, 70, 80, 90, and 100 even with 12 on Inch Measure.

And the backside of the sliding Piece is divided into Inches, Halves, Quarters, and half Quarters, and figured from 12 to 24, so that it may be slid out to 2 Foot, to Measure the length of a Tree, or any thing else you have Occasion to Measure.

The Use of the double Scale.

Example 1.

Suppose there is a Geometrical Square, whose sides are 3 Feet $\frac{1}{2}$ each: Set 1 Foot on the Line B, to 3 $\frac{1}{2}$ on the Line A; then against 3 $\frac{1}{2}$ on the Line B, is 12 Foot $\frac{1}{4}$ on the Line A, which is the Content of such a Square

F.	Pts	
3	—6	} Arithmetically.
	3—6	
—	—	
10	—5	
1	—9	
—	—	
12	—3	Proof.

In this Work by Arithmetick I Multiply 3 F. 6 by 3. and it produces 10 Feet 6 Inches; then I take the half of 3 F. 6 for the 6 Inches (by the way of Practice) because 6 Inches is the $\frac{1}{2}$ of 12, &c. Again, Suppose there is a long Square, whose Content is 27 Feet $\frac{1}{2}$ Long, and 16 Foot $\frac{1}{4}$ Wide; What is its Content?

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27 $\frac{1}{2}$
The Area 446 Foot
&c.

16 $\frac{3}{4}$

F. pts.

27,50 Length

16,25

Answer 446,8750 Prod.

Suppose the Side of a Rhombus to be 8 Foot 6 Inches $\frac{3}{4}$, and the Breadth, or Line *AB*, 8 F. 4 $\frac{1}{2}$, what is the Content? Set 1 Foot on the Line *B*, to 8 Feet $\frac{5}{8}$ on the Line *A*, then against 8 Feet $\frac{5}{8}$ on the Line *B*, is 71 Feet $\frac{40}{100}$ parts of a Foot on the Line *A*. And to know the Value of the Decimal, or part of the Foot look for $\frac{40}{100}$ on the Rule, and you will find against it 4 Inches $\frac{3}{4}$ so that the Content of this Rhombus is 71 Foot, 4 Inches $\frac{3}{4}$.

Again Suppose the Length of a Rhomboides to be 17 F. 3. or 17 $\frac{25}{100}$ and the Breadth 8 F. 7 or 8 $\frac{58}{100}$ what is the Content? Set 1 Foot on the Line *B*, to 17,25 on the Line *A*, then against 8,58 on the Line *B*, is 148 Foot on the Line *A*. The figure hath been presented before, and operated Arithmetically, therefore here unnecessary.

To Measure a Triangle by the Rule.

Every Triangle is half of that long Square whose Length and Breadth are equal to the Perpendicular and Base: Therefore from the greatest Angle or Corner, Let fall a perpendicular Line to the opposite Side (as hath been said before) of the Base, and to find its Content, take half the Length of the Base, and the whole Perpendicular, or $\frac{1}{2}$ the Length of the Perpendicular, and the whole Base, and then Multiply, &c.

Example.

Let the Base of a Triangle be 4 Foot 1 Inch $\frac{3}{4}$, and the Perpendicular 2 Foot 1 $\frac{3}{4}$: The half of the one, is 2 Feet 7 parts; and of the other, 1 Foot 7

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parts. Set one on the Line B, to 4,15 on the Line A; then against 1,07 half the Perpendicular on the Line B, is 4 Feet and almost $\frac{1}{2}$ a Foot for the Content. Or if you set 1 on the Line B, to 1,07 on the Line A, against 4,15 on the Line B, is 4, and almost $\frac{1}{2}$ a Foot on the Line A.

Again, another Way. If you set 1 on the Line B, to 4,1 on the Line A, then against 2,15 on the Line B, is 8 Foot $\frac{2}{3}$ (which is about 11 Inches) on the Line A, the half whereof is 4 Foot 5 Inches $\frac{1}{2}$ which is the Content of the Triangle.

Of the Girt Line.

Suppose the Diameter of a Circle be $\frac{21}{100}$ what is its Content? Set 11 on the Girt Line D, to 95 on the double Line C; then against 2 Foot $\frac{25}{100}$ on C, the Girt Line, is 3 Foot $\frac{28}{100}$ on the double Scale of Numbers D, which is the Content.

Board Measure.

Suppose a Board to be 27 Inches $\frac{1}{2}$ broad, and 15 Foot $\frac{1}{4}$ long, what is its Content? Set 12 on the double Scale B, to 27 $\frac{1}{2}$ on the double Scale A; then against 15 Feet $\frac{1}{4}$ on the double Scale B, is 35 Feet, the Content on the double Scale A.

When Dimensions are Feet and Parts, and the Content required in Feet and Parts.

Admit a Board to be 24 $\frac{3}{4}$ Long, and 1 Foot $\frac{1}{2}$ Broad what is the Content? Set 1 on the double Scale B, to 1 $\frac{1}{2}$ on the double Scale A; then against 24 $\frac{3}{4}$ on the double Scale B, is 37 Feet $\frac{1}{10}$ on the double Scale A, and is the Content.

Suppose a piece of Glazing be 29 Inches $\frac{1}{2}$ Long, and 7 Inches Broad, what is the Content? Set 144 (represented by 1,44) on the Line B, to 7 Inches on the Line A; then Against 29 $\frac{1}{2}$ on the Line B, is 1 Foot and almost $\frac{1}{2}$ on the Line A.

Suppose a Room Wainscotted of 44 Feet in Compass and

and 9 Foot $\frac{3}{4}$ high, what is the Content ; Set 1 on the double Scale B, to 44 Feet $\frac{1}{2}$ on the double Scale A ; then against 9 Feet $\frac{3}{4}$ on the double Scale B is 433 Feet $\frac{2}{5}$ on the double Scale A, the Content.

Admit a piece of Painting 13 Foot $\frac{1}{2}$ Broad, and 23 Foot $\frac{1}{2}$ Long what is the Content ? Set 9 on the double Scale B, to 13 $\frac{1}{2}$ on the double Scale A, then against 23 $\frac{1}{2}$ on the double Scale B, is 35 Yards $\frac{1}{4}$ on the double Scale A, and is the Content.

Of Bonds, Bills, Indentures, Letters of Attorney, Wills, and other useful Writings.

Precedents of these are very Necessary, not only for the understanding of them, but to know how to make them authentickly, on emergent Occasions, &c.

A Bond from One to One.

NOVERINT universi per præsentes me Abrahamum Darmell de Parochia Sancti Sepulcherii in Civitate Londini Generesum, teneri & firmiter obligari Johanni Melder de Lond' Armigero, in Quinquaginta Libris bonæ & legalis Monetæ Angliæ, Solvend' Eidem Johanni Melder aut suo certo Attornato, Executoribus; Administratoribus, vel assignatis suis, ad quam quidem solutionem bene & fideliter faciendam obligo me, Hæredes, Executores Administratores meos firmiter per præsentes Sigillo Leo Sigillat' primo die Junii, Anno Regni Domini nostri Georgii, II. Dei gratia, Angliæ, Scotiæ, Franciæ, & Hiberniæ, Regis, Fidei, Defensoris, &c. Quinto, Annoq; Domini 1735.

The Condition of this Obligation is such, That if the above bounden Abraham Darmell, his Executors, Administrators, or his Assigns, shall, well and truly pay, or cause to be paid to the above-named John Melder, his Heirs, Executors, or Administrators, the

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sum

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sum of twenty five Pounds of good and lawful Money of *England*, in or upon the twentieth Day of *August* next ensuing the Date hereof, without fraud or further delay: Then this Obligation to be void, and of none effect; or else to stand and remain in full force and Virtue.

Sigillat' & Deliberat'

Abraham Darmell.

in Prasentia

Gregory Needy,

Thomas Trusty.

A Bill with a Penalty.

K Now all Men by these Presents, That I *John Jenkings* in the City of *Chichester*, in the County of *Sussex*, Visqualer, do acknowledge myself indebted to *Martin Moneyman* of *East Grinstead* in the County aforesaid, *Grassier*, in the Sum of twenty Pounds of good and lawful Money of *Great Britain*, to be paid unto the said *Martin Moneyman*, his Heirs, Executors, Administrators, or Assigns, in or upon the 29th Day of *September* next ensuing the Date hereof, without fraud or further delay: for and in Consideration of which payment well and truly to be made and done, I bind myself, my Heirs, Executors, and Administrators, in the Penal Sum of forty Pounds, of the like lawful Money, firmly by these presents: In Witness whereof, I have hereunto set my Hand and Seal this twenty fifth Day of *June*, in the eighth Year of the Reign of our Sovereign Lord King *George II.* and in the Year of our Lord God, 1735.

Signed, Sealed, and Delivered,

in the Presence of

Titus Testimony

Andrew Affidavit.

☉ John Jenkings.

A short Bill or Note of One's Hand.

K Now all Men by these Presents, that I *Peter Pennylefs*, of the Parish of *St. Saviour's Southwark*, in the County of *Surrey*, *Blacksmith*, do owe, and own myself to stand indebted to *Robert Rich* of the Parish of *St. Andrews Holbourn*, in the County of *Middlesex*, Gent. in the just and due Sum of five Pounds, of lawful Money of *England*; which by these presents I promise to pay unto him the said *Robert Rich*, at or upon the sixth Day of *October* next ensuing the Date hereof: For the true performance of which Payment, well and truly to be made, and in Witness hereof, I have set my Hand to these presents, this fifth Day of *May*, 1735.

Peter Pennylefs.

A Penal Bill from Two to One.

K Now all Men by these Presents, That We *Laurence Luckless* and *Peter Pauper*, both of *St. Dunstan-Stepney*, in the County of *Middlesex*, *Weavers*, do acknowledge and own ourselves to stand indebted to *Gabriel Greedy*, of the Parish of *St. Olave Southwark*, in the County of *Surrey*, *Feltmaker*, in the just and due Sum of ten Pounds, of good and lawful Money of *England*, to be paid unto him the said *Gabriel Greedy*, his Heirs, Executors, Administrators, or Assigns, in or upon the 14th Day of *October* next ensuing the Date hereof, without fraud or further delay; and in consideration of which payment well and truly to be made, We whose Names are above written, do bind our Heirs, Executors, and Administrators, in the Penal sum of twenty Pounds of the like lawful Money, firmly by these presents: In Witness whereof, We have hereunto set our Hands and Seals, this 15th Day of *May*, in the eighth Year of the Reign of our Sovereign

Lord

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Lord King, George H. &c. and in the Year of our Lord God. 1735.

*Signed sealed and delivered,
in the Presence of
Wimbleton Witness.
Timothy Testis.*

● Lau. Luckless.
● Peter Pauper.

Note, That Bills without Penalty are of no more force or lasting than Book Debts, as they are not Sealed; yet they are esteemed better Security, because the Parties Hand, if he contends, is to be proved against him: But oft times, on an Adjustment of Accounts, it is usual to have the Parties Hand to the Book, which is as valid as the other; but, in my Opinion, there ought to be a Witness to either of them.

Note also, It may be necessary, for those that do not understand Latin Obligations, to give them one in English, suited to any Condition, by only altering the Name or Names, Place or Places of Abode, Title or Titles, Sum or Sums of Money, Date, &c. which will be as good in Issue as if in Latin.

An Obligation in English.

K Now all Men by these Presents, That I *James Jenks*, of the Parish of *St. John Baptist*, in the City of *London*, *Harberdasher*, am holden and firmly do stand bound unto *Peter Pinch*, of the Parish of *Islington*, in the County of *Middlesex*, Yeoman, in the sum of fifteen Pounds, of good and lawful Money of *England*, and to be paid unto him, the said *Peter Pinch*, his certain Attorney, his Executors, Administrators, or Assigns, to them or either of them: To the which payment well and truly to be made, I do hereby bind my Self, my Heirs, Executors, and Administrators firmly by these presents: Sealed with my Seal. Dated the 3d Day of *August*, in the ninth Year of the
Reign

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Reign of our Sovereign Lord George, II. of Great Britain, France, and Ireland, King, Defender of the Faith and in the Year of our Lord God 1735.

Note, Thus you may proceed of your self, and save the Charge of going too far distant to a Scrivener or an Attorney, here being no other Charge but the Stamp'd Paper and your own Trouble of Writing.

A Letter of Attorney.

KNOW all Men by these Presents, That I *Charles Careful*, of *Lewis*, in the County of *Suffex*, Apothecary, (for divers Considerations and good Causes me hereunto moving, have made, ordained, constituted, and appointed, and by these Presents, do make, ordain, constitute, and appoint, my trusty Friend *William Wagstaff* of *Pemsey*, in the County aforesaid, Gent. my true and lawful Attorney, for me, in my Name, and to my Use, to ask, demand, recover, or receive, of and from *A. B. of Rye* in the said County, the Sum of Forty Pounds; giving, and by these Presents granting to my said Attorney, my sole and full Power and Authority, to take, pursue, and follow such legal Courses for the recovery, receiving, and obtaining of the same, as I my self might or could do, were I personally present; and upon the Receipt of the same, Acquittances, and other sufficient Discharges, for me and in my Name, to make, sign, seal, and deliver; as also, one more Attorney or Attorneys under him, to substitute or Appoint, and again at his Pleasure, to revoke, and further to do, perform, and finish for me, and in my Name, all and singular Thing or Things, which shall or may be Necessary, touching and concerning the Premises, as fully, thoroughly, and entirely, as I the said *Charles Careful* in my own Person might or could do, in and about the same: Ratifying, Allowing, and Confirming, whatsoever
my

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my said Attorney shall lawfully do or cause to be done, in and about the Execution of the Premises, by Virtue of these Presents: In Witness whereof, I have hereunto set my Hand and Seal, the 6th Day of May, in the Eighth Year of our Sovereign Lord George II. by the Grace of God, King of Great Britain, &c. and in the Year of our Lord God, 1735.

A Letter of Attorney, by a Seaman.

K Now all Men by these presents, That *I Timothy Tarpaulin*, Mariner, now belonging to his Majesty's Ship the *Rye*; for divers good Causes and Considerations me thereunto moving, have, and by these presents do make my trusty Friend (or beloved Wife) *Henry Hearty*, Citizen and Baker of *London*, my true and lawful Attorney, for me, and in my Name, and for my use, to ask, demand, and receive, of and from the Right Honourable the Treasurer or Paymaster of his Majesty's Navy, and Commissioners of Prize Money, and whom else it may concern, as well all such Wages and Pay, Bounty Money, Prize Money, and all other Sum and Sums of Money whatsoever, as now are, and which hereafter shall and may be due, or payable unto me; also all such Pensions, Salaries, Smart-Money, or all other Money and Things whatsoever, which now are, or at any Time hereafter shall or may be due to me, for my Service, or otherwise in any of his Majesty's Ship or Ships, Frigots or Vessels: Giving, and hereby granting, unto my said Attorney, full and whole Power, to take, pursue, and follow such legal Ways and Courses, for the recovery, receiving and obtaining, and discharging upon the said Sum or Sums of Money, or any of them, as I myself might or could do, were I personally present; and I do hereby ratify, allow, and confirm, all and whatever my said Attorney shall lawfully do, or cause to be done, and about

about the Execution of the Premises, by Virtue of these Presents : In Witness whereof, I have hereunto set my Hand and Seal, this 22d Day of March, &c.

● *Timothy Tarpaulin.*

A short Will in legal Form.

IN the Name of God, *Amen.* The twelfth Day of *April, 1732.* I *William Weakly* of the City of *London*, *Haberdasher*, being very sick and weak in Body, but of perfect Mind and Memory, Thanks be given unto God : Therefore calling unto Mind the Mortality of my Body, and knowing that it is appointed for all Men once to die, do make and ordain this my last Will and Testament : That is to say, principally and first of all, I give and recommend my Soul into the Hands of Almighty God that gave it, and my Body I recommend to the Earth, to be buried in decent Christian Burial, at the Discretion of my Executors ; nothing doubting but at the General Resurrection I shall receive the same again, by the mighty Power of God. And as touching such Worldly Estate wherewith it hath pleased God to bless me in this Life, I give, demise and dispose of the same in the following Manner and Form.

Imprimis, I give and bequeath to *Elizabeth*, my dearly-beloved Wife, the Sum of Five hundred Pounds of lawful Money of *England*, to be raised and levied out of my Estate, together with all my Household Goods, Debts, and Moveable Effects.

Item, I give to my well-beloved Daughter *Elizabeth Weakly*, whom I likewise constitute, make and ordain my sole Executrix of this my last Will and Testament, all and singular my Lands, Messuages and Tenements, by her freely to be possessed and enjoyed. And I do hereby utterly disallow, revoke and disannul all and every other former Testaments, Wills, Legacies, and Bequests,

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Bequests, and Executors, by me in any ways before-named, willed and bequeathed; ratifying and confirming this, and no other, to be my last Will and Testament. In Witness whereof, I have hereunto set my Hand and Seal, the Day and Year above written.

*Signed, sealed, published, pronounced,
and declared, by the said William Weakly,
Weakly, as his last Will and
Testament, in the Presence of us
the Subscribers,*

Henry Hardy,
Samuel Short,
William Wortle.

*Note, If a Will be already made, and the Person hath
no Mind to alter it, but to add something more, there may
be affixed the following Codicil or Schedule to it, and it
will stand good in Law, as Part of the Will.*

A Codicil or Schedule to a Will.

Be it known to all Men by these Presents, That I *William Weakly* of the City of *London*, Haberdasher, have made and declared my last Will and Testament in Writing, bearing Date the twelfth Day of *April*, 1732. I the said *William Weakly*, by this present Codicil, do ratify and confirm my said last Will and Testament; and do give and bequeath unto my loving Cousin and Godson *William Weakly* junior, the sum of Fifty Pounds of good and lawful Money of *England*, to be paid unto him the said *William Weakly*, by my Executrix, out of my Estate: And my Will and Meaning is, That this Codicil or Schedule be adjudged to be a Part and Parcel of my last Will and Testament; and that all Things therein mentioned and contained, be faithfully and truly performed, and as fully and amply in every Respect, as if the same were so declared and set down in my said last Will and Testament,

Or The Carpenter's Exact Rule. 401

ment. Witness my Hand this twentieth Day of April,
1735. *William Weakly, senior.*

A Deed of Gift.

TO all People to whom these Presents shall come,
I *George Generous* do send Greeting. Know ye,
That I the said *George Generous* of the Parish of *Pan-*
bridge, in the County of *Middlesex*, Brick-maker, for
and in Consideration of the Love, Good will and Af-
fection which I have, and do bear towards my loving
Sister *Sarah Sorrowful*, of the same Parish and County,
Widow; have given and granted, and by these Pre-
sents do freely give and grant unto the said *Sarah Sor-*
rowful, her Heirs, Executors, or Administrators, all
and singular my Goods and Chattels, now being in my
present Dwelling-house in the Parish aforesaid, known
by the Name of *Fisher's Figary*; of which these Pre-
sents I have delivered her the said *Sarah Sorrowful*, an
Inventory signed with mine own Hand, and bearing
even Date, to have and to hold all the said Goods and
Chattels in the said Premises or Dwelling-house, to
her the said *Sarah Sorrowful*, her Heirs, Executors, or
Administrators, from henceforth, as her and their pro-
per Goods and Chattels absolutely without any man-
ner of Condition. In Witness whereof, I have here-
unto put my Hand and Seal, this tenth Day of April
1735.

Signed, sealed and delivered

● *George Generous.*

in the Presence of

Daniel Drayton,

Aaron Atkins.

Note, This President may be extended to the giving a-
way of Cattle, Corn, House, or Land, if not Entailed &c.
but the Particulars must be named, &c.

An

An Indenture for an Apprentice.

THIS Indenture Witnesseth, That *Richard Reynolds*, Son of *Robert Reynolds* late of *Pemsey* in the County of *Sussex*, hath put himself, and by these Presents doth voluntarily put himself, and of his own free Will and Accord put himself Apprentice to *Charles Carpenter*, Citizen and Linnen-draper of *London*, to learn his Art, Trade, or Mistry, after the Manner of an Apprentice, to serve him from the Day of the Date hereof, for and during the full Term of Seven Years next ensuing : During all which time, he the said Apprentice his said Master faithfully shall serve, his Secrets keep, his lawful Commands every where gladly obey. He shall do no Damage to his said Master, nor see it to be done by others, without letting or giving Notice therefore to his said Master. He shall not waste his said Master's Goods, nor lend them unlawfully to others. He shall not commit Fornication, nor contract Matrimony within the said Term. At Cards, Dice, or any unlawful Game, he shall not play, whereby his said Master may be damaged, with his own Goods, or Goods of others. He shall not absent himself Day nor Night from his said Master's Service, without his Leave. Nor haunt Ale-houses, Taverns, or Play-houses : But in all things behave himself as a faithful Apprentice ought to do, during the said Term. And the said Master shall use the utmost of his endeavour to teach, or cause to be taught and instructed, the said Apprentice in the Trade and Mistry he now professeth, occupieth or followeth : and procure and provide for him the said Apprentice, sufficient Meat, Drink, Apparel, Washing and Lodging, fitting for an Apprentice, during the said Term. And for the true Performance of all and every the said Covenants and Agreements either of the said Parties bind themselves.

Or, the Carpenter's Exact Rule: 403

selves unto the other by these Presents. In Witness whereof, they have interchangeably put their Hands and Seals this Sixteenth Day of April, in the 8th Year of the Reign of our Sovereign Lord George II, by the Grace of God, King of Great Britain, &c. and in the Year of our Lord God 1735.

Note, If an Apprentice be Inrolled, he cannot sue out his Indenture, but upon Proof of unmerciful Usage, want of Victuals, and other Necessaries, or his Master's being incapable of Teaching him his Trade, or not causing it so to be done at his proper Charge by others. And the same holds good in relation to a Mistress. But there being no Inrollment, an Indenture may be sued out without shewing Cause, in Cities and Corporations, &c.

A General Release.

KNOW all Men by these Presents, That I *Peter Peaceable* of *Hastings*, in the County of *Sussex*, Tobacconist, have remised, released, and for ever quit Claim to *William Winter* of *Rye* in the County aforesaid, Fish-Chapman his Heirs, Executors, and Administrators, of all and all manner of Action and Actions, Suits, Bills, Bonds, Writings, Debts, Dues, Duties, Accompts, Sum and Sums of Money, Leases, Mortgages, Judgements by Confession, or otherwise obtained, Executions, Extents, Quarrels, Controversies, Trespases, Damages, and Demands whatsoever, which by Law, or Equity, or otherwise howsoever, I the said *Peter Peaceable*, against the said *William Winter* ever had, and which I, my Heirs, Executors, or Administrators, shall or may claim, challenge, or demand, for or by Reason, Means or Colour of any Matter, Cause or Thing whatsoever, to the Day of the Date of these Presents. In Witness whereof, I have hereunto set my Hand and Seal, this Fifteenth Day of April, &c.

● *Peter Peaceable.*

Some

404. *The Young Man's best Companion.*
Some Notes, Rules, Directions, and Monthly
Observations, concerning Gardening.

JANUARY. *Aquarius ♒, on the Water bearer.*

THIS Month being generally very cold, and the Earth frozen, there is little to be done in Gardening ; but you may prepare a Mixture of Earth and Sheeps Dung to rot and mellow together for a considerable time, to Layer your Flowers with ; and make ready such Ground as you shall have Occasion for, by Trenching, &c. and dunging that part that wanteth, and be provided with Horse, Neat, and Sheeps Dung of two Years old, and with it mingle Loam, and under Pasture fine Mould, and stir them together, and then skreen it, &c. Uncover the Roots of Fruit Trees where there is occasion, and transplant such as you have a Mind to, and set Quick-sets ; prune and lopp Trees, and gather Scions for grafting before the Buds appear.

FEBRUARY. *Pisces ♓.*

In this Month prune Vines and Wall Fruit-Trees before the Buds swell ; but for the Nectarines, and other choice Fruit, you may omit it till the next Month ; in nailing the Branches, do not over-strain them, that hindering the Motion of the Sap ; and, in a judicial Pruning lies a Master-piece of Gardening. If the Frost hath killed your Cabbage plants set in *September*, sow Seeds now in a hot Bed, made thus : Dig a Trench according to Discretion, about two Foot deep, in the warmest Place of your Garden, free from the chilling Blasts of the North and East Winds ; tread it full of Horse-litter with the Dung, and cover it with rich Earth, half a Foot thick ; the Earth must be screened

Or The Carpenters Exact Rule. 405

Screened or sifted pretty fine ; and cover it with Straw or Mats, in cold Nights only : In such Beds may be sown the Seeds of Cucumbers, Musk-Melons, or Purslain. The Grafts of former Years grafting, may be now removed. Sow Peas, and set Beans about a Foot distant. Also now, plant the Slips of Goosberries and Currants. Mow your Fruit Trees, and drain your Orchard and Garden of Wet proceeding from melted Snow or Rain, and settled at the Roots of Trees, &c.

M A R C H. *Aries* ♈, or the Ram.

Dung your Orchard and plant Trees that remain unset ; cover the Roots of Trees that have continued bare since *Autumn*. Sow Carrots, Parsnips, Parsley-seeds, and Turnips for Seed. Set Onions and Leaks, and more Beans and Peas. Now you may take off the Litter from your Asparagus-Bed, and, after a little digging or stirring it, sit some good Earth upon it ; But if you make a new Bed, make it as directed in the last Month. Set short-stalked Cabbage-plants near a Yard asunder, on the Edges of your Carrot-ground. This whole Month you may graft, cut off the Tops of your budded Stalks, and prune Grafts of the last Year.

A P R I L. *Taurus* ♉, or the Bull.

In this Month you may sow Scurvygrass, Carnations, Radishes, Marjoram, Thyme, Winter-savoury, Purslain, Marygolds, Hyssop, and Lettuce : You may likewise set Slips of Rosemary, Lavender, Thyme, Artichokes, &c. Remove your tender Shrubs, and slip them after gentle Showers ; and also set French Beans.

M A Y. *Gemini* ♊, or the Twins.

Begin to graft in this Month, according as you find the Buds ready ; which take off the Middle of your Sprouts. Fetch out your Greens, and transplant them
into

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into Boxes filled with good Earth mixed with one part of rotten Cow Dung, putting Sticks or light Rubbish to make the Earth lie light; so make a Hole for the Water at the Bottom; then set your Plants therein, but not deep: water them, and set them in the Sun.

JUNE. *Cancer ♋, or the Crab.*

In this Month, water new planted Trees, and put rotten Fern about their Stems. Inoculate Apples, Pears, Wall-fruit, &c. Lop off needless Branches from your Vines, and stop the Joints. Gather Herbs to keep, in the Full of the Moon. You may again sow Radish, Lettuce, and Chervil.

JULY. *Leo ♌, or the Lion,*

In this Month, prune Apricocks and Peaches, leaving the most likely Shoots well placed. Water young planted Trees and Layers. Let Herbs past their Season, run to seed; clip Box that grows irregular, after Rain; slip Stocks, Plants and Flowers; lay Mirtles, Jessamines, and other Greens. At the End of this Month, lift your Bed of Off-sets of Tulips, Anemonies, Ranunculus's, &c. Sow Annemony Seeds in fine sifted rich Earth, either in Beds or Boxes.

AUGUST. *Virgo ♍, or the Virgin Sign.*

Prune off superfluous Branches, and Shoots of the second Spring; pluck up Suckers from about the Root; Inoculate early, if at all, in this Month. Sow Collyflowers and Cabbages for Winter-plants; as also Corn-Sallade, Mary-golds, Lettuce, Carrots, Parsnips, Spinage, Onions, Endive, Angelica, Scurvy-grass, Larkheel, Columbines, Fox-Gloves, Holyocks, and such Plants as endure Winter. Transplant such Lettuce as you would have abide all Winter; pull up ripe Onions, Garlick, &c. gather such Seeds as are ripe, and
clip

Or, The Carpenter's Exact Rule. 407

clip such Herbs before the full of the Moon, an handfull high. Sow Perslain, Chervil, &c. Make Summer Cyder and Perry, and gather Seeds of such Shrubs as are throughly ripe.

S E P T E M B E R. *Libra ♎ or the Ballance.*

Gather your ripe Winter Fruit, besure in dry Weather. You may yet sow Lettuce, Radish, Spinage, and Winter Herbs. Transplant most part of Eating and Physical Herbs, Artichokes, Asparagus, Roots, Strawberries, &c. As the Weather directs about *Michaelmas*, in fair Weather (but not in a Foggy Day) retire your favourite Greens, and choicest Plants (being dry) into the Conservatory. When the Cold comes on, set such Plants that will not endure the House, into the Earth two or three Inches below the Surface, and under a Southern Exposure, covered and cloathed with Hay, for their Security against the Cold of the Night; but open them in Sun-shiny Days, and again in favourable warm Showers.

O C T O B E R. *Scorpio ♏, or the Scorpion.*

In this Month, it is proper to set Fruit-stones; set them 3 Inches deep, and the sharp End uppermost and cover them with Straw: Also you may this Month sow Genoa Lettuce, which, with small Care, will be, good Sallading all Winter; cover them with Bell glasses in hard Weather.

N O V E M B E R. *Sagitary ♐, or the Archer.*

Now trench and fit Ground for Artichokes and plant Trees for Standards and Walls. Also lay in your Cellars, Carrots, Turnips, Parsnips, Cabbages and Coliflowers for Seed, to be transplanted in the Spring: Now also take up Potatoes for Winters spending.

D E C E M-

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DECEMBER. *Capricorn ♑, or the Goat.*

In this Month, prune Standard Trees, and Wall-Fruit Trees, Vines, and Stocks from Grafting; set early Peas and Beans, &c.

Before this Head of Gardening is concluded, it may be proper to say something in relation to Inoculating or Grafting.

Grafting is accounted the nicest Piece of Art relating to a Gardiner; the Meaning of the Word Inoculating or Grafting (being now a familiar Word on another Occasion) is to transform or reform the Fruit of one Tree into that of another, by an artificial transposing or transplanting of a Twig or Scion, a Bud or Leaf taken from the same Tree, or of some other kind, and placed or put to, or into, that of another, called *Grafting in the Cleft*.

The best time for gathering Grafts, is in the Middle of *February*. Observe, that the Scion is to be cut below the Knot.

Grafting in the Cleft.

First cut or saw off the Top of the Stock to a curious Smoothness; then cut two Gashes with a Sharp Knife; then with small Wedges, sharpened according to the Bigness of the Graft, being thrust in, raise the Bark of the Stock, and put in the Graft, exactly shaped as the Wedge; then close it hard with your Hand, and bind it about with Clay and Horse-dung mixed. In this Manner may any Fruits be Grafted, whether Apples, Pears, Plumbs, Cherries, &c. The Apple is commonly Grafted on Crab-tree Stocks.

T H E

THE
Family's best Companion :

GIVING

INSTRUCTIONS

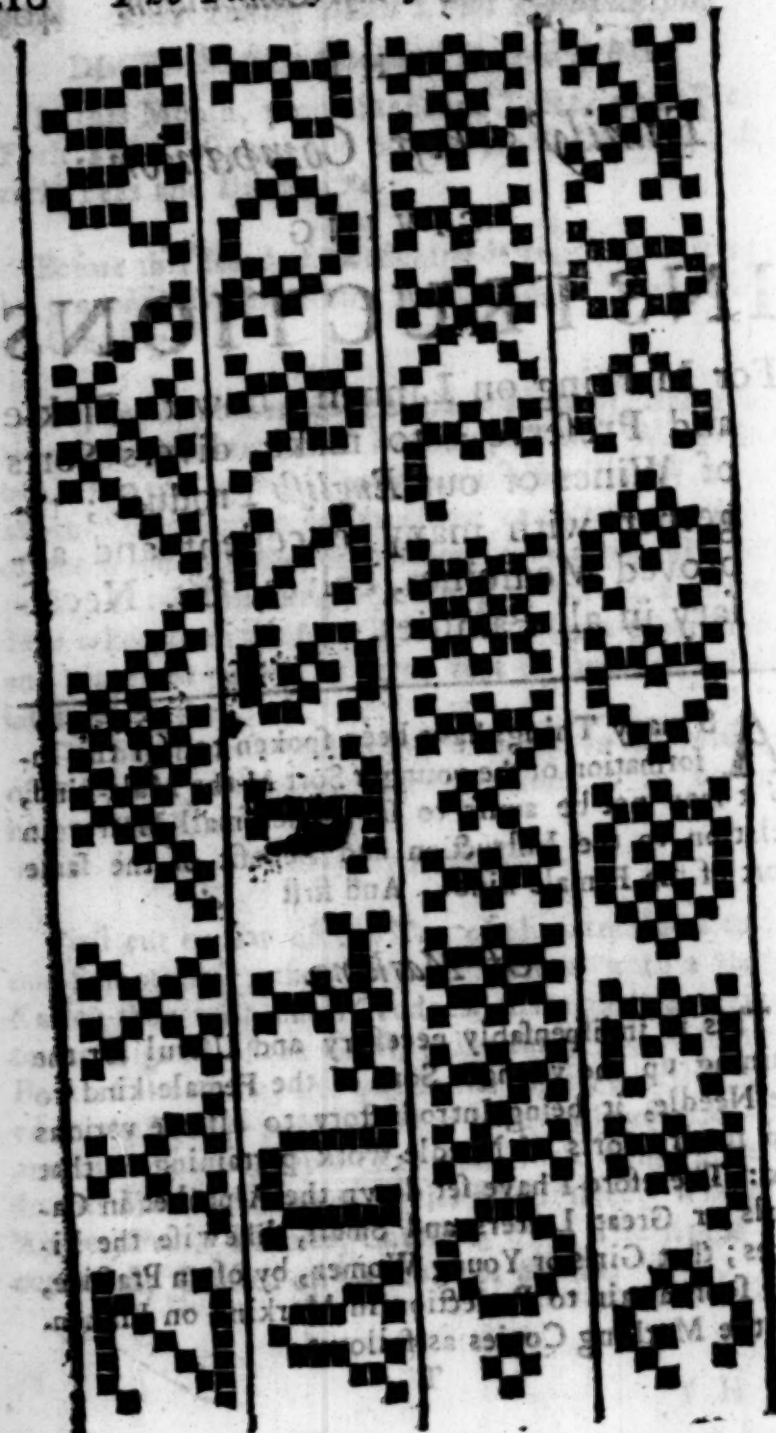
For Marking on Linnen ; how to Pickle and Preserve ; to make divers Sorts of Wines of our *English* Product ; together with many excellent and approved Medicines, Salves, &c. Necessary in all Families.

AS many Things have been spoken to, for the Information of the younger Sort of the Male-kind, so it may not be amiss to say some small Matter in relation to the Instruction and Benefit of the same Sort of the Female kind. And first

Of Marking.

This is indispensably necessary and Useful for the training up the younger Sort of the Female-kind to the Needle, it being Introductory to all the various and sundry sorts of Needle-work pertaining to that Sex : Therefore I have set down the Alphabet in Capitals or Great Letters and Small, likewise the Figures ; that Girls or Young Women, by often Practice, may soon attain to Perfection in Marking on Linnen. See the Marking Copies as follows.

T



For the first time

of the year

of the year

Of Pickling, Preserving, Candyng, &c.

To Pickle Cucumbers.

WASH them and dry them in a Cloth; then take Water, Vinegar, Salt, Fennel Tops, some Dill-Tops, and a little Mace; make it sharp enough to the Taste; then boil it a while, then take it off, and let it stand till cold; then put in the Cucumbers, and stop them down close, and within a Week they will be fit to eat.

To Pickle Cucumbers green.

Take 2 Quarts of Verjuice or Vinegar, and a Gallon of fair Water, a Pint of Bay-Salt, a Handful of green Fennel or Dill; boil it a little, and when cold put it into a Barrel, and then put the Cucumbers to the Pickle, and you may keep them all the Year.

To Pickle French Beans.

Take them before they are ripe, and cut off the Stalks; then take good Wine Vinegar, and boil with Pepper and Salt; season them to your Palate, and let it stand till cold; then take the Beans, and put them into a Pot placing Dill between the Layers, and then put in the Pickle, and cover them close for 3 Weeks; then take the Pickle, and boil it again, and put it to the Beans boiling hot; cover them close, and, when cold, they will be fit to eat.

Or French Beans may be pickled thus: Take your Beans, and string them, boil them tender, then take them off, and let them stand till cold; then put them into pickle of Beer, Vinegar, Pepper, Salt, Cloves, Mace, and a little Ginger.

To Pickle Eldern, or any other Buds of Trees.

Give them 1 or 2 Walms with Vinegar, Salt, whole Pepper, long Mace, and a little Lemon-peel in pieces; then drain them, and let the Buds and Liquor cool separately; afterwards put them in a Pot, and cover them with your Pickle.

To

To Pickle Walnuts to eat like Mangoes.

Take green Walnuts before the Shell is grown to any Hardness in them; pick them from the Stalks, and put them into cold Water, and set them on a gentle Fire till the outward Skin begins to peel off; then with coarse Cloths wipe it off; then put them into a Pot, and put Water and Salt therein, shifting it once a Day for 10 Days, till the bitterness and discolouring of the Water be gone; then take a good Quantity of Mustard-seed, which beat up with Vinegar till it becomes coarse Mustard; then take some Cloves of Garlick, some Ginger; and a little beaten Cloves and Mace, make a Hole in each Nut, and put in a little of this; then take White wine Vinegar, and boil them together; which put to the Nuts boiling hot, with some Pepper, Ginger, Cloves, and Mace, as also some of the Mustard and Garlick, which keep close stopped for Use.

To Pickle Mushrooms.

First blanch them over the Crowns, and barb them beneath; then put them into a Pan of boiling Water; then take them forth, and let them drain; when they are cold, put them up into your Pot or Glass, and put to them Cloves, Mace, Ginger, Nutmeg, and whole Pepper; then take White-wine, a little Vinegar, and Salt: So pour the Liquor into the Mushrooms, and stop them close for Use.

*To Pickle any Sort of Flowers for Sallads, as
Glove-gilly Flowers, &c.*

Put them into a Gally-Pot, with as much Sugar as they weigh; fill them up with Wine-Vinegar: To a Pint of Vinegar, a Pound of Sugar.

*To Pickle Samphire, Broom-Buds, Asken-Keys,
Purslain, &c.*

Take Samphire, and pick the Branches from the dead Leaves; then lay it in a Pot, and make a strong

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Brine of White or Bay Salt ; in the boiling scum it clean ; being boiled, and cold, put it to the Samphire ; cover it, and keep it for all the Year ; and when there is Occasion to use it, take and boil it in fair Water, but the Water must boil before you put it in ; when it is boiled, and become green, let it cool ; then take it out, and put it into a wide-mouth'd Glass, and put strong Wine-Vinegar to it, and keep it close for Use.

To pickle Lemon and Orange Peel.

Boil them in Vinegar and Sugar, and put them into the same Pickle : Observe to cut them in small long Thongs, the Length of half the Peel of your Lemon : It ought to be boil'd in Water before 'tis Boil'd in Vinegar and Sugar.

To preserve green Apricocks.

Take them when they are small and tender ; peel them and put them in hot Water, but let them not boil ; let them lie there till they begin to be green ; then take them out, and put them in cold Water ; then boil your Sugar, and let your Apricocks run a little of the Water from them ; then put them into the Sugar, and let them boil till the Syrup becomes thick ; then put them into an earthen Pan, and let them remain there a Week ; then put them into a preserving Pan, and make them boil again till the Syrup grows thick ; then put them once more into an earthen Pan, and let them stand till they are cold ; then take them out of their Syrup, and lay them on your Ardoise, and dry them in your Stove, turning them often till dry ; then put them in Boxes on Paper.

To preserve Fruit green.

Take Pippins, Apricocks, Pears, Plumbs, or Peaches, when they are Green ; scald them in hot Water, and peel them ; then put them into another Water, not so hot

hot as the first ; then boil them very tender, and take the Weight of them in Sugar, and put to them as much Water as will make a Syrup to cover them ; then boil them somewhat leisurely, and take them up ; then boil the Syrup till it be somewhat thick, and, when cold, put them together.

To preserve Rasberries.

Take good Rasberries that are not too ripe, but very whole ; take away the Stalks, and put them into a flat-bottomed earthen Pan ; boil Sugar, and pour it over your Rasberries, and let them stand to be cool, and when they are cold, pour them softly into your preserving Pan, and let them boil till their Syrup be boiled pretty thick ; scum them very well in the boiling ; this done, put them in Pots, and when cold, cover them up close, for Use.

To preserve Barberries.

Take 1 lb of Barberries pickt from the Stalks, put them in a pottle Pot, and set it in a Brass Pot full of hot Water ; and when they be stewed, strain them, and put to the Barberries 1 lb $\frac{1}{2}$ of Sugar, and to them put a Pint of Red-Rose Water, and boil them a little ; then take half a Pound of the fairest Clusters of Barberries you can get, and dip them in the Syrup while it is boiling ; then take the Barberries out and boil the Syrup till it is thick, and, when cold, put them in Glasses with the Syrup.

To preserve Currants.

Lay a Layer of Currants, and then a Layer of Sugar, and so boil them as before prescribed for Rasberries ; scum them in boiling till the Syrup is pretty thick ; then take them off, and, when they are cold, put them in gally Pots, or Glasses closely stopp'd.

To preserve green Wallnuts.

Boil the Wallnuts till the Water tastes bitter, then take them off, and put them in cold Water, and peel
off

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off the Bark, and weigh as much Sugar as they weigh, and a little more Water than will wet the Sugar; set them on the Fire, and when they boil up, take them off, and let them stand 2 Days, and then boil them again once more.

To preserve Grapes.

Stamp and strain them; let them settle a while; before you wet a Pound of Sugar, or Grapes with the Juice, stone the Grapes, and save the Juice in the stoning; take them off, and put them up.

To preserve Cherries.

First take some of the worst Cherries, and boil them in fair Water, and when the Liquor is well coloured, strain it; then take some of the best Cherries, with their weight in beaten Sugar; then lay one Layer of Sugar and another of Cherries, till all are laid in the Preserving Pan; then pour a little Liquor of the worst Cherries into it, then boil the Cherries till they are well coloured, then take them up and boil the Syrup till it will button on the Side of a Plate, and, when they are cold, put them up in a Glass close covered for Use.

To candy Cherries.

Take Cherries before they be full ripe, take out the stones; then take clarified Sugar boiled to a Height, and pour it on them.

To candy Pears, Plumbs, Apricocks, &c.

Take them, and give every one a cut half through; then cast Sugar on them, and bake them in an Oven as hot as for Manchet, close stopped; let them stand half an Hour; then lay them one by one upon Glass Plates to dry, and they will appear very fine and clear: In this manher you may candy any other Fruit.

To candy Flowers.

Pick them very clean, and to every Ounce of Flowers put two Ounces of hard Sugar, and 1 oz. of Sugar-Candy, and dissolve them in Rose-Water, and boil them till they come to Sugar again; and when it is almost cold, put in your Flowers, and stir them together, &c.

Of the making fundry Sorts of English Wines.

Currant Wine.

Pick the Currans (when they are full ripe) clean from the Stalks; then put them into an earthen Vessel, and pour on them fair and clean hot Water, that is, a Quart of Water to a Gallon of Currans; then bruise or mash them together, and let them stand and ferment; then cover them for twelve Hours, strain them through fine Linnen into a large earthen Crock (as they say in *Suffex*;) and then put the Liquor into a Cask, and thereto put a little Ale-Yeast; and, when worked and settled, Bottle it off: This is exceeding pleasant, and very wholesome for cooling the Blood: In a Week's time it will be fit for Bottling.

Artificial Claret.

Take 6 Gallons of Water, 2 Gallons of the best Cyder, and thereto put 8 Pounds of the best Malaga Raisins bruised; let them stand close covered in a warm Place for 2 Weeks, stirring them every 2 Days well together; then press out the Liquor into the Vessel again, and add to it a Quart of the Juice of Barberries, and a Pint of the Juice of Bramble-berries or Rasberries, which perhaps is the best) to which put a Pint of the Juice of Black-Cherries; work it up with Mustard-seed covered with Bread paste for 3 or 4 Days by the Fireside; after which let it stand a Week, then Bottle it off, and it will become near as good as, if not exceed, common Claret.

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Gooseberry Wine.

The best Way is to take to every 3 Pounds of Fruit, one Pound of Sugar, and a Quart of fair Water; boil the Water very well; but you must put the aforesaid Quantity of Sugar when it is boiled; bruise the Fruit, and steep it 24 Hours in the Water; stir it sometimes, then strain it off, and put the Sugar to it, and let it stand in a Rundlet close stopp'd, for a Fortnight; then draw it off, and set it up in a cool Cellar, and in 2 Months it will be fit to drink.

Raspberry Wine.

Take the Raspberries clear from the Stalks; to a Gallon of which, put a Bottle of White-Wine, and let them Infuse in an earthen Vessel 2 or 3 Days, close covered; then bruise the Berries in the Wine, and strain thro' fine Linnen gently, then let it simmer over a moderate Fire; scum off the Froth, and then strain it again, and with a $\frac{3}{4}$ of a lb of Loaf Sugar, to a Gallon, let it fettle; then in half a Pint of White-Wine boil about an Ounce of well scented Cinnamon, and a little Mace, and put the Wine strained from the Spice into it, and Bottle it up.

Damson Wine.

Dry the Damsons in an Oven after you have drawn your Bread, then to every Quart of Damsons put 3 Quarts of fair Water, but first boil it very well; then put the Water and Damsons into a Rundlet with Sugar; and having stood a Time sufficient, bottle it off.

Wine of Grapes.

When they are fully ripe, in a dry Day, pick off those Grapes that are ripest, and squeeze them in a Fat or Press made for that Purpose, in which must be a fine Canvas Bag to contain the Grapes; and when in the Press, do not squeeze them so hard as to break the Stones, if you can help it, because the bruised

Stones

Stones will give the Wine a disagreeable Taste : Then strain it well, and let it settle on the Lees, in such a Cask or Vessel as you may draw it off without raising the Bottom ; then season a Cask well with some scalding Water, and dry or scent it with a Linnen Rag dipped in Brimstone, by fixing it at the Bouge, by the Bung or Cork ; then put the Wine into it, and stop it close for 48 Hours ; then give it vent at the Bouge, with a Hole made with a Gimblet ; in which put a Peg or Faucet, that may easily be moved with the Fingers ; then in about 2 Days time close it up ; and in about 2 or 3 Months time it will be fit for Drinking, and prove almost as good as French-Wine.

Wine of Strawberries or Raspberries.

Mash the Berries, and put them into a Linnen Bag, as abovesaid for the Grapes, and squeeze them into a Cask, and then let it work as aforesaid in the Grape Receipt, &c. In this manner may Cherry-Wine be made ; but then you must break the Stones, contrary to what was said before concerning the Grapes.

A short Way for Cherry Wine.

Squeeze the Juice of Cherries into a Cask, and thereto put a small Quantity of Sugar corresponding to the Quantity of Juice ; and when stood a Month, it will be pleasant Liquor.

Black-Cherry Wine.

In the same Manner, take a Gallon, or more, of the Juice of Black Cherries, and keep it in a Vessel close stopped till it works : and after it is fine, add an Ounce of Sugar to each Quart, and a Pint of White-Wine.

To make Cyder.

Grind, stamp, or pound your Apples, and put them into a Press, and squeeze them through Hair Bags into a Tub ; then let it settle, and, according to your Quantity of Juice, put in some Sugar at Discretion ; then

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then work it up with Ale-Yeast, and let it stand a Week; then prepare your Vessel according to the Quantity, clean and dry; then put it up; after which, put into a Bag 2 lb of stoned Raisins, 2 oz. of whole Ginger, and 2 oz. of Ising-glass, and see it tied right with a strong string fixed without side the Barrel, that the Bag may sink to the Bottom; and after 2 Months it will be fit for use.

Mead.

Take 6 Gallons of Water, and thereto put 6 Quarts of Honey, stirring it till the Honey be through-mixed; then set it over the Fire, and, when ready to boil scum it very well; then put to it one Quarter of an Ounce of Mace, and as much Ginger, and half an Ounce of Nutmegs, some sweet Marjoram, Thyme, sweet Bryar, together a Handful; then boil them in the Liquid, then let it stand by till cold, and then Barrel it up for Use.

Of Jellies.

Let them be of Apples, Currans, Rasberries, &c. Take out the clear Liquor (when squeezed) and boil it with Sugar till it is thick as a Jelly; then put it up in Glasses.

Family Medicines.

Almonds of the Ears fallen down.

Take a little Bole Armoniac in Powder, and with it mix some Venice Turpentine, and spread it on Sheeps Leather as broad as a Stay, and apply it under the Throat, from Ear to Ear.

Ague.

Drink the Decoction (that is, the boiling off of any Herb) of Camomile, and sweeten it with Treacle; which drink when warm in Bed, and sweat 2 Hours. Or to the Wrists apply a Mixture of Rue, Mustard, and Chimney-soot, by way of Plaster.

Asthma,

Asthma, or Shortness of Breath.

Take a Quart of Aqua vitæ, 1 oz. of Anniseed bruised, 1 oz. of Liquorice sliced, half a Pound of stoned Raisins, and let them steep 10 Days in the above-mentioned; then pour it off into a Bottle, with two Spoonfuls of fine Sugar, and stop it very close.

St. Anthony's Fire.

Take a Purge, and anoint the Place with the Marrow of Mutton.

Bruise or Scald outward.

Take a Quart of Neats-foot Oil, half a Pound of red Lead, 2 oz. of Bees-wax; boil them together 3 Hours, and stir them well. — Or, Oil of Eldern bathed or rub'd on the Place, will have the same Effect.

Bruises Inward.

Drink the Decoction of Comfrey with Bread and Butter.

Bound in the Body.

Take Cream of Tartar mixed with Honey, very frequently.

Boiles or Sores.

Eat Rosemary and Sage with Bread and Butter, and apply Wheat Flour and Honey by way of Plaister.

Bloody Flux.

Take as much Linnen Cloth as will make a Suppository; being wrapp'd round Button-wise; wet it in the best Aqua vitæ, or Aqua composita; which properly applied, will help them in 2 or 3 Applications. This is an approved and sure Medicine.

Bleeding at the Nose.

Put into your Nostrils, Coney Wool roled in Bole Armoniac.

Blood purged.

Drink often of the Tea of Ground Ivy, or of Saffras Chips.

Canker

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Canker in the Mouth.

Take the Juice of Plantain and Rose-water mixed, and with it frequently wash your Mouth.

For a Cough.

When you are going to Bed, drink Brandy, Treacle and Sallad Oil, mixed : Or, Take a Mixture of Butter and brown Sugar.

Convulsions in Children.

Take unslacked Lime one Quart, and to it put five Quarts of Spring-Water ; let it stand 24 Hours, in which time stir it three times ; scum it, and take the clear Water, and let it stand 12 Hours more, and strain it through a Cloth ; and being put into an Earthen-pot, put to it Anniseeds and Fennel Seeds, of each a Quarter of a Pound ; Liquorice bruised, and Sassafras, of each a Handful : Let them stand four or five Days, and then let the Child drink a Quarter of a Pint, Morning and Evening, as long as it lasteth.

Consumption.

Take as much New Milk as a common Scill will hold, to which put the Herbs following ; viz. Hyssop, Cowslip Leaves, Horehound, and Coltsfoot, of each a Handful ; and of Maiden-hair 1 Ounce ; let them stand all Night, then still them off ; and when it is to be drunk, sweeten it with Syrup of Cowslips, or good Sugar.

Collick.

Beat the Hipps of Wild Roses (gathered in Winter) into Powder, and half as much sliced Nutmeg ; mix them, and take some in all your Drink : This is an excellent Remedy.

Drought in an Ague to cure.

Take a small Quantity of Burridge, Sorrel, Violet Leaves, and Strawberry Leaves ; seeth them in two Quarts of fair running Water till it consume to one Quart ; then take Almonds and bleach them, and, when

when beaten, put them to the said Water, and to it put a little Sugar, and drink it warm.

Dropsy.

Take Broom-Ashes, and Mustard-seed steeped in a Pint of White-wine ; of which drink often. *Approved.*

For a Sore Throat.

Take Columblines and Cinkfoil, stamp them and strain them into Milk, and drink it very warm.

For the Gripes.

Take a sliced Nutmeg in a Quartern of Brandy warmed over the Fire ; to which put the beaten Yolk of an Egg, with a little Water and Sugar ; stir them together over the Fire to thicken a little : Take it at Night, going to Bed.

For the Stone or Stoppage of Urine.

Take a Quantity of Thyme, Parsley, Tops of Fennel, and Cinkfoil a little Quantity, 5 or 6 Cloves of Garlick ; stamp them all together, and strain them into White-wine or Ale, and drink of it Morning and Evening.

To Cause an Appetite.

Seeth Centaury in fair Water, and drink it in a Morning fasting, to the Quantity of 9 Spoonfuls, lukewarm, for 3 Days.

An easy and safe Purge.

Take Cream of Tartar 1 oz. Jalop and Brimstone of each a Quarter of an oz. the Jalop must first be beaten into fine Powder ; and mix them thoroughly together in a Mortar ; but if the Person be hard to work on, put 2 Drams of Jalop more.

Small-Pox.

When warm in Bed, drink Mulled Ale with Marygold Flowers ; and sweat a little, to bring them thoroughly out ; and to keep them from sinking, take Brimstone and Treacle.

For

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For the Itch.

Take Frankincense and beat it small, and mingle it with Oil of Bays, and therewith anoint all over.

For a Burn or Scald.

Take Oil of Eldern, and anoint the Place: This is a sure Remedy.

Against a Fever.

Take a Handful of Bay Leaves, and a large Handful of red Sage; seeth them in two Quarts of Ale till they come to one, and let the Patient (being in Bed) drink thereof a good Draught warmed, with a little Sugar.

To make an approved Ointment for old Aches, &c.

Stamp Smallage, and add to it some Aqua vitæ, and Boars Grease; stir them well together, and anoint the Place before the Fire, Evening and Morning.

To make Melilot; excellent for Plaisters.

Take Melilot, Pimpernel, and Scabious, of each 2 Handfuls; cut them small, then beat them in a Mortar with two Pounds of Hogs Lard; let it stand in the Sun-shine 7 or 8 Days, (it being usually made in June;) then melt and strain it well; then add as many more fresh Herbs, and set it in the Sun as before, and then melt and strain it again; then boil it till the Juice is consumed; then take it off the Fire, and put to it beaten Rozin, Bees-wax, and Venice Turpentine, of each 1 Ounce; when cold, put it up in Pots, or make it up in Rolls.

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